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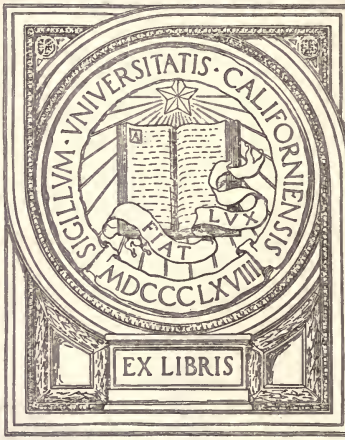

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Catalogue of the Wheeler Gift of Books, Pamphlets and Periodicals in the Library of the American Institute of Electrical Engineers

EDITED BY

WILLIAM D. WEAVER

Member American Institute of Electrical Engineers

WITH INTRODUCTION, DESCRIPTIVE AND CRITICAL NOTES
BY

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Professor of Physics, Manhattan College

VOLUME II

NEW YORK: AMERICAN INSTITUTE
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SECTION II

Excerpts from Periodicals—Miscellanea

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Excerpts from Periodicals—Miscellanea

2448. **Wallis,** John. (1616–1703.) Letter to Captain Edmund Halley, concerning the captain's map of magnetick variations, and some other things relating to the magnet. (Philos. Trans. Roy. Soc., 1702, Vol. 23, pp. 1106–1112.) 4to. *London, 1704*

Gellibrand's determination of magnetic declination; reasons for believing that the mariner's compass was invented by an Englishman.
—See also *217*.

2449. **Gray,** Stephen. (? –1736.) New electrical experiments. (Abstr. Philos. Trans. Roy. Soc., 1719–1733, Vol. 6, pt. 2, pp. 7–27.) 4to. *London, 1734*

Interesting list of bodies with which the experiments were made, p. 27.

2450. **A new barometer.** (Abstr. Philos. Trans. Roy. Soc., 1719–1733, Vol. 6, pt. 2, pp. 28–34.) 1 table. 4to. *London, 1734*

Application of the barometer to measurement of heights above sea-level.

2451. **Magneticks.** (Abstr. Philos. Trans. Roy. Soc., 1719–1733, Vol. 6, pt. 2, pp. 1–23.) 4to. *London, 1734*

"Variation" in London, in the Baltic, Hudson's Bay; numerous observations with the dipping-needle.

2452. **Eames,** John. (? –1744.) An account of a book entitled, Traité physique et historique de l'Aurore Boréale, par M. de Mairan. Suite des Mémoires de l'Académie Royale des Sciences, année 1731; or, A philosophical and historical treatise concerning the Aurora Borealis, by Mr. de Mairan, being a supplement to the Mémoires of the Academy of Sciences for the year 1731. (Philos. Trans. Roy. Soc., Vol. 38, pp. 243–256.) 4to. *London, 1735*

The writer holds that aurorae are due to the extension of the solar atmosphere, remarks on the height of our atmosphere and on the altitude at which aurorae appear. (See No. 382.)

2453. **Electricity.** (Abstr. Philos. Trans. Roy. Soc., 1732–1744, Vol. 8, pt. 2, pp. 393–632.) 4 plates, 1 tab. 4to. *London, 1747*
Early experiments on *frictional* electricity by Wheeler and others.

2454. **Electricity.** (Abridg. Philos. Trans. Roy. Soc., 1743–1750, Vol. 10, pt. 2, pp. 269–428.) 3 plates. 4to. *London, 1756*
Includes plates of *frictional* machines and electrical apparatus.

2455. **Magneticks.** (Abridg. Philos. Trans. Roy. Soc., 1743–1750, Vol. 10, pt. 1, Chapt. 4, pp. 1–20.) 1 plate. 4to. *London, 1756*

2456. **Darwin,** Erasmus. (1731–1802.) Remarks on the opinion of Henry Eeles, concerning the ascent of vapour. (Philos. Trans. Roy. Soc., Vol. 50, pp. 240–254.) 4to. *London, 1757*
Eeles maintained that every *particle* of a vapor has an *electric charge* which is the sole cause of its ascensional movement. (See No. 377.)
—See also 555.

2457. **Lane,** T(imothy). (1734–1807.) Description of an electrometer invented by Mr. Lane; with an account of some experiments made by him with it; in a letter to Benjamin Franklin. (Philos. Trans. Roy. Soc., Vol. 57, pp. 451–460.) 1 plate. 4to. *London, 1766*
Note on the principle of the author's unit-jar.
—See also 2506.

2458. **L'Epinasse,** C. Description of an improved apparatus for performing electrical experiments, in which the electrical power is increased, the operator entirely secured from receiving any accidental shocks, and the whole rendered more convenient for experiments than heretofore. (Philos. Trans. Roy. Soc., Vol. 57, pp. 186–191.) 1 plate. 4to. *London, 1767*
A method of protection from a Leyden jar discharge.

2459. **Priestley,** Joseph. (1733–1804.) An investigation of the lateral explosion and of the electricity communicated to the electrical circuit, in a discharge. (Philos. Trans. Roy. Soc., Vol. 60, pp. 192–210.) 4to. *London, 1770*
Some induction effects due to the discharge of a Leyden jar.

2460.— —Experiments and observations on charcoal. (Philos. Trans. Roy. Soc., Vol. 60, pp. 211–228.) 4to. *London, 1770*
The electric conductivity of charcoal.
—See also 422, 2491.

2461. **Winn,** J. L. A letter to Dr. Benjamin Franklin, giving an account of the appearance of lightning on a conductor fixed from the summit of a mainmast of a ship down to the water. (Philos. Trans. Roy. Soc., Vol. 60, pp. 188–191.) 1 plate. 4to. *London, 1770*
Early use of a lightning conductor for the protection of ships.

2462. **Cavendish,** Henry. (1731–1810.) An attempt to explain some of the principal phenomena of electricity by means of an elastic fluid. (Philos. Trans. Roy. Soc., Vol. 61, pp. 584–677.) 1 plate. 4to. *London, 1771–1772*
Views on electrical theory of the celebrated English chemist and physicist;

this is one of the few papers published by the author during his lifetime.
—See also 2132, 2465, 2487, 3803.

2463. **Henley,** William (? –1779.) Experiments concerning the different efficacy of pointed and blunted rods, in securing buildings against the stroke of lightning. (Philos. Trans. Roy. Soc., Vol. 64, pp. 133–152.) 1 plate. 4to. *London, 1773*

Pamphlet written during the London controversy of *Points v. Knobs.* Henley invented the "quadrant electrometer," or electric semaphore.

2464.——An account of some new experiments in electricity. (Philos. Trans. Roy. Soc., Vol. 64, pp. 389–431.) 1 plate. 4to.
London, 1774

Experiments with Leyden jars, the electricity of the atmosphere and the conducting power of metals.
—See also 443, 2469, 2472.

2465. **Cavendish,** Henry. (1731–1810.) An account of some attempts to imitate the effects of the torpedo by electricity. (Philos. Trans. Roy. Soc., Vol. 66, pp. 196–225.) 1 plate. 4to.
London, 1775

These experiments attracted considerable attention at the time and contributed largely towards settling the matter in debate.
—See also 2462.

2466. **Hutchins,** Thomas. (1730–1788.) Experiments on the dipping-needle. (Philos. Trans. Roy. Soc., Vol. 65, pp. 130–138.) 4to.
London, 1775

Determination of magnetic dip in Hudson's Straits and other places in the vicinity of Hudson's Bay.

2467. **Lorimer,** J(ohn). (1732–1795.) Description of a new dipping-needle. (Philos. Trans. Roy. Soc., Vol. 65, pp. 79–84.) 4to.
London, 1775

A dipping needle designed for use at sea.
—See also 594.

2468. **Fothergill,** John. (1712–1780.) An account of the magnetical machine contrived by the late Dr. Gowin Knight. (Philos. Trans. Roy. Soc., Vol. 66, pp. 591–599.) 1 plate. 4to.
London, 1776

Remarks on the best form to give a compass needle.

2469. **Henley,** W(illiam). (? –1779.) Experiments and observations on a new apparatus, called a machine for exhibiting perpetual electricity, in a letter to Dr. Horsley. (Philos. Trans. Roy. Soc., Vol. 66, pp. 513–522.) 4to. *London, 1776*

Virtually a small plate condenser.
—See also 2463.

2470. **Nairne,** Edward. (1726–1806.) Experiments on water obtained from the melted ice of sea-water, to ascertain whether it be fresh or not; and to determine its specific gravity with respect to other water; also experiments to find the degree of cold in which sea-water begins to freeze. Addressed to Sir John Pringle. 8 pp. 4to. (*London*) *1776*

2471. **Cavallo,** Tiberio. (1749–1809.) New electrical experiments and observations, with an improvement of Mr. Canton's electrometer. (Philos. Trans. Roy. Soc., Vol. 67, pp. 388–400.) 4to. *London, 1777*

Miscellaneous experiments on frictional electricity; also the author's portable "electrometer".

—See also 463, 2475, 2485.

2472. **Henley,** W(illiam). (? –1779.) Experiments and observations in electricity. (Philos. Trans. Roy. Soc., Vol. 67, pp. 85–143.) 1 plate. 4to. *London, 1777*

Observations on Franklin's theory of the Leyden jar; bow and violin strings oppositely electrified; electrical origin of *water-spouts.*

—See also 2463.

2473. **Semi-globes;** or, Electrical orbs. iv+8 pp. 4to. London, for A. Webb. *London, 1777*

Nothing electrical but the title.

2474. **Wilson,** Benjamin. (1708–1788.) New experiments upon the Leyden phial, respecting the termination of conductors. (Philos. Trans. Roy. Soc., Vol. 68, pp. 999–1012.) 2 plates. 4to. *London, 1778*

Paper connected with the author's contention that lightning-conductors should terminate in *knobs* rather than in *points;* Leyden jars *repaired.*

—See also 334.

2475. **Cavallo,** Tiberio. (1749–1809.) An account of some new experiments in electricity, with the description and use of two new electrical instruments. (Philos. Trans. Roy. Soc., Vol. 70, pp. 15–291.) 1 plate. 4to. *London, 1779*

Electrical dust figures of Prof. Lichtenberg of Goettingen; electrometer for observations of atmospheric electricity.

—See also 2471.

2476. **Ingenhousz,** Jan. (1730–1799.) Improvements in electricity. (Philos. Trans. Roy. Soc., Vol. 69, pp. 661–673.) 4to. *London, 1779*

The improvements have reference to the plate-machine (Ramsden's) instead of the globular or cylindrical form previously in use.

2477.——On some new methods of suspending magnetical needles. (Philos. Trans. Roy. Soc., Vol. 69, pp. 537–546.) 1 plate. 4to. *London, 1779*

Reference to *laminated* magnets; liquid damping, thin tubular magnets.

2478. **Swift,** Wm. Account of some experiments in electricity. (Philos. Trans. Roy. Soc., Vol. 69, pp. 454–461.) 2 plates. 4to. *London, 1779*

The author connects a conductor to the rubber of the electrical machine to collect *negative* electricity.

2479. **Chambers,** E(phraim). (? –1740.) Cyclopaedia: Articles Electricity and Magnetism. (Vol. III, 25 pp.) Folio. *London, 1781*

These articles contain much general information.

2480. **Brook,** Abraham. (fl. 1789.) Account of a new electrometer. (Philos. Trans. Roy. Soc., Vol. 72, pp. 384–388.) 2 plates. 4to. *London, 1782*

For use in special electrostatic work.
—See also 553.

2481. **Volta,** A(lessandro). (1745–1827.) Del condensatore, ossia del modo di render sensibilissima la pui debole elettricita sia naturale, sia artificiale. (Memoria divisa in due parti, letta nella Societa R. di Londra.) (Philos. Trans. Roy. Soc., Vol. 71, pp. 237–280.) 4to. *London, 1782*

Description of the author's *condensing electroscope.*

2481a.——(English translation.) Of the method of rendering very sensible the weakest natural or artificial electricity. (Philos. Trans. Roy. Soc., Vol. 72, pp. vii–xxxiii.) 4to. *London, 1782*

—See also 428, 2493, 2497.

2482. **Morgan,** W(illiam). (? –1883.) Electrical experiments made in order to ascertain the non-conducting power of a perfect vacuum. (Philos. Trans. Roy. Soc., Vol. 75, pp. 272–278.) 1 plate. 4to. *London, 1785*

The author concludes some experiments made by him on the electric discharge in a rarefied medium by saying that "we cannot suppose a perfect vacuum to be a perfect conductor without supposing an absurdity."

2483. **Bennet,** Abraham. (1750–1799.) Description of a new electrometer. (Philos. Trans. Roy. Soc., Vol. 77, pp. 26–34.) 3 plates. 4to. *London, 1786*

This is the author's well-known *gold-leaf electroscope.*

2484.——An account of a doubler of electricity, or a machine by which the least conceivable quantity of positive or negative electricity may be continually doubled, till it becomes perceptible by common electrometers, or visible in sparks. (Philos. Trans. Roy. Soc., Vol. 77, pp. 288–296.) 1 plate. 4to. *London, 1787*

This *doubler* embodies the fundamental principles of *influence* machines, such as those of Holtz and Wimshurst.
—See also 552, 2492.

2485. **Cavallo,** T(iberio). (1749–1809.) Of the methods of manifesting the presence and ascertaining the quality of small quantities of natural or artificial electricity. (Philos. Trans. Roy. Soc., Vol. 78, pp. 1–22.) 1 plate. 4to. *London, 1787*

The Bakerian lecture given in 1787; the author's pith-ball electroscope in which fine silver wire is used instead of linen thread; Bennet's gold-leaf and Volta's condensing electroscope; also Bennet's doubler.

2486.——Description of a new electrical instrument capable of collecting together a diffused or little condensed quantity of electricity. (Philos. Trans. Roy. Soc., Vol. 78, pp. 255–260.) 1 plate. 4to. *London, 1788*

The instrument here described is similar in principle but not in arrangement to Volta's condensing electroscope.
—See also 2471.

2487. **Cavendish,** H(enry). (1731–1810.) On the conversion of a mixture of dephlogisticated and phlogisticated air into nitrous acid, by the electric spark. (Philos. Trans. Roy. Soc., Vol. 78, pp. 261–276.) 4to. *London, 1788*

Details of the celebrated experiment on the formation of nitric acid by the passage of electric sparks through a volume of air.

—See also 2462.

2488. **Gray,** Edward Whitaker. (1748–1806.) Observations on the manner in which glass is charged with the electric fluid and discharged. (Philos. Trans. Roy. Soc., Vol. 78, pp. 121–124.) 4to. *London, 1788*

Strictures on Franklin's theory of the Leyden jar.

2489. **Milner,** Isaac. On the production of nitrous acid and nitrous air. (Philos. Trans. Roy. Soc., Vol. 79, pp. 300–313.) 4to. *London, 1789*

Experiments suggested by those of Priestley and Cavendish.

2490. **Nicholson,** W(illiam). (1755–1815.) Experiments and observations on electricity. (Philos. Trans. Roy. Soc., Vol. 79, pp. 265–288.) 1 plate. 4to. *London, 1789*

Flap of silk used on frictional machines; the electric action of points; danger from the *return stroke.*

—See also 510.

2491. **Priestley,** Joseph. (1733–1804.) Experiments on the transmission of the vapour of acids through a hot earthen tube, and further observations relating to phlogiston. (Philos. Trans. Roy. Soc., Vol. 79, pp. 289–299.) 4to. *London, 1789*

Chemical paper of historical interest.

—See also 2459.

2492. **Bennet,** A(braham). (1750–1799.) A new suspension of the magnetic needle, intended for the discovery of minute quantities of magnetic attraction, also an air vane of great sensibility; with new experiments on the magnetism of iron filings and brass. (Philos. Trans. Roy. Soc., Vol. 82, pp. 81–98.) 1 plate. 4to. *London, 1792*

The suspension used is a *spider's thread;* experiments made with such a magnetoscope; the author (a clergyman) was the inventor of the gold-leaf electroscope.

—See also 2483.

2493. **Volta,** A(lessandro). (1745–1827.) Account of some discoveries made by Mr. Galvani, with experiments and observations on them. In two letters to Cavallo. (Philos. Trans. Roy. Soc., Vol. 83, pp. 10–44.) 4to. *London, 1793*

Two letters on Galvani's discoveries addressed to Mr. Tiberio Cavallo of London.

—See also 2481.

2494. **Read,** John. Experiments and observations made with the doubler of electricity, with a view to determine its real utility, in the investigation of the electricity of atmospheric air, in

different degrees of purity. (Philos. Trans. Roy. Soc., Vol. 84, pp. 266–274.) 4to. *London, 1794*
The author finds that air, infected with animal respiration or vegetable putrefaction, is always negatively electrified while the surrounding atmosphere is positively electrified.
—See also 585.

2495. **MacDonald,** John. (1759–1831.) Observations of the diurnal variation of the magnetic needle at Fort Marlborough, in the island of Sumatra. (Philos. Trans. Roy. Soc., 1796, pp. 340–349.) 4to. *London, 1796*
Tables of observations of magnetic declination made in 1794-1795 together with remarks on theories of terrestrial magnetism.

2495a.— —Observations of the diurnal variation of the magnetic needle, in the island of St. Helena; with a continuation of the observations at Fort Marlborough, in the island of Sumatra. (Philos. Trans. Roy. Soc., 1798, pp. 397–402.) 4to. *London, 1798*
The observations at St. Helena extended over a period of one month of the year 1796; Halley's theory recommended.
—See also 689, 2540.

2496. **View** of the telegraph erected on the admiralty office, Charing Cross, in Febr., 1796. By an officer on duty. 1 plate. L. folio. London, Fores. *London, 1796*
This is a mechanical telegraph; the letters were made by opening and closing ports in a vertical frame, which ports were viewed through a telescope at the distant station.

2497. **Volta,** A(lessandro). (1745–1827.) On the electricity excited by the mere contact of conducting substances of different kinds. (In una lettera a S. G. Banks, F. R. S. Letta il 26 giugno. 1800. Como, 20 marzo, 1800.) (Philos. Trans, Roy. Soc., 1800, pp. 403–431.) 1 plate. 4to. *London, 1800*
This is Volta's famous letter, written in French, to Sir Joseph Banks announcing the invention of the voltaic pile, here called *Organe électrique artificiel.* (See No. 731.)
—See also 2481.

2498. **Arithmetical tables,** with questions for examination and explanatory notes. 9. edition. 35 pp. 24mo. *London, (1800)*
A pamphlet on English weights and measures.

2499. **Bischoff,** Christian Heinrich Ernst. (? –1774.) Commentatio de usu galvanismi in arte medica. (Sue, Hist., Vol. III., pp. 67–142.) 2 plates. 8vo. *Jena, 1801*
The voltaic battery and its use in the cure of nervous disorders. (See No. 630a.)

2500. **Davy,** (Sir) Humphry. (1778–1829.) An account of some galvanic combinations, formed by the arrangement of single metallic plates and fluids, analogous to the new galvanic apparatus of Mr. Volta. (Philos. Trans. Roy. Soc., 1801, pp. 397–402.) 4to. *London, 1801*
Various combinations of small plates of silver, copper, lead with cloths between them soaked with different liquids.
—See also 634, 2511, 2514, 2518, 2543, 2548, 2566, 2573, 2604.

2501. **Wollaston,** William Hyde. (1766–1828.) Experiments on the chemical production and agency of electricity. (Philos. Trans. Roy. Soc., 1801, pp. 427–434.) 4to. *London, 1801*
Imitation of "galvanic" phenomena by common electricity.
—See also 2586.

2502. **Alexandre,** (Jean). New telegraph at Tours. (English Chronicle & Whitehall Evening Post, June 19–22, 1802.) Folio. *London, 1802*
Short note on sympathetic dial-telegraph which is fully described in the (London) *Electrician,* April 21, 1883. (Vol. 10, p. 539).

2503. **Geoffroy** Saint-Hilaire, É(tienne). (1772–1844.) Mémoire sur l'anatomie comparée des organes électriques de la raie torpille, du gymnote engourdissant, et du silure trembleur. (Annales du Museum d'Hist. Nat., Year I., pp. 392–407.) 1 plate. 4to. *Paris, 1803*
Paper on the physiology of electric fishes.

2504. **Woods,** Samuel. Essay on the Franklinian theory of electricity. (Philos. Mag., Ser. I., Vol. 17, pp. 97–113.) 8vo. *London, 1803*
Advantages and defects of the Franklinian theory.

2505. **Flinders,** Mathew. (1760–1814.) Concerning the differences in the magnetic needle, on board the *Investigator,* arising from an alteration in the direction of the ship's head. (Philos. Trans. Roy. Soc., 1805, pp. 186–197.) 4to. *London, 1805*
It is here supposed that the attractive power of the different bodies in a ship which are capable of affecting the compass needle, acts at a point similar to that of the center of gravity of ordinary masses.

2506. **Lane,** Timothy. (1734–1807.) On the magnetic attraction of oxides of iron. (Philos. Trans. Roy. Soc., 1805, pp. 281–284.) 4to. *London, 1805*
"My intention in this communication is to prove generally that mere oxides of iron are not magnetic."
—See also 2457.

2507. **Coulomb,** (Charles Augustin). (1736–1806.) Resultat des différentes méthodes employées pour donner aux lames et aux barreaux d'acier le plus grand degré de magnétisme. (Mém. Instit. Paris, Cl. Sc. Math. et Phys., Vol. 6, pp. 399–422.) 4 plates. 4to. *Paris, 1806*
Methods of making powerful steel magnets.
—See also 490.

2508. **Gilpin,** George. Observations on the variation and on the dip of the magnetic needle, made at the apartments of the Royal Society, between the years 1786 and 1805 inclusive. (Philos. Trans. Roy. Soc., 1806, pp. 385–419.) 4to. *London, 1806*
These notes include remarks on the "variation" observations of Borough, Gunter and Gellibrand.

2509. **Robertson,** James. Observations on the permanency of the compass at Jamaica. (Philos. Trans. Roy. Soc., 1806, pp. 348–356.) 4to. *London, 1806*
Reference to the magnetic observations of Columbus and of Halley.

2510. **Description** of the nature and use of Hadley's quadrant; containing the theory and a demonstration of the principles on which the instrument is founded. 32 pp. 1 plate. 12mo. *London, 1806*

Also a short historical notice of the *quadrant*.

2511. **Davy,** (Sir) Humphry. (1778–1829.) On some chemical agencies of electricity. (Philos. Trans. Roy. Soc., 1807, pp. 1–56.) 1 plate. 4to. *London, 1807*

The Bakerian lecture for 1806; mode of action of the voltaic pile; electrical phenomena accompanying earthquakes and volcanic eruptions.
—See also 2500.

2512. **Duncan,** J. S. Proposal for the establishment of a national Museum. (Philos. Mag., Ser. I., Vol. 29, pp. 296–298.) 8vo. *London, 1807*

This concluding paper refers to magnetic and electrical apparatus.

2513. **Pasley,** (Sir) C(harles) W(illiam). (1780–1861.) A polygrammatic telegraph for day signals. (Philos. Mag., Ser. I., Vol. 29, pp. 292–296.) 8vo. *London, 1807*

Signals mechanically transmitted by means of two arms fixed to the top of a vertical post.
—See also 2520, 2557, 2568, 4379.

2514. **Davy,** (Sir) Humphry. (1778–1829.) On the decomposition and composition of the fixed alkalies. (Philos. Trans. Roy. Soc., 1808, pp. 1–44.) 4to. *London, 1808*

Properties of potassium and sodium.

2515.——Electro-chemical researches, on the decomposition of the earths with observations on the metals obtained from the alkaline earths and on the amalgam procured from ammonia. (Philos. Trans. Roy. Soc., 1808, pp. 333–370.) 4to. *London, 1808*

Composition of the alkaline earths; their chemical properties said to depend on their electrical powers; a theory of the phenomena of volcanoes.
—See also 2500.

2516. **Brande,** William T(homas). (1788–1866.) Observations on albumen, and some other animal fluids; with remarks on their analysis by electro-chemical decomposition. (Philos. Trans. Roy. Soc., 1809, pp. 373–384.) 4to. *London, 1809*

List of experiments made with a battery of 20 plates each of which was four feet by two feet.
—See also 900, 2524, 2957.

2517. **Children,** John George. (1777–1852.) An account of some experiments, performed with a view to ascertain the most advantageous method of constructing a voltaic apparatus for the purposes of chemical research. (Philos. Trans. Roy. Soc., 1809, pp. 32–38.) 4to. *London, 1809*

The author's battery consisted of 20 pairs of zinc and copper plates, each plate being four feet high and two feet wide. The exciting liquid was a

mixture of three parts of nitric and one part of sulphuric acid diluted with 30 parts of water, the quantity of liquid used being 120 gallons.
—See also 2530.

2518. **Davy,** (Sir) Humphry. (1778–1829.) On some new electro-chemical researches on various subjects, particularly the metallic bodies from the alkalies and earths, and on some combinations of hydrogen. (Philos. Trans. Roy. Soc., 1810, pp. 401–415.) 2 plates. 4to. *London, 1810*
Arguments are given for considering potassium and sodium elementary bodies.
—See also 2500.

2519. **Forster,** B. M. Description of a method of fitting up in a portable form the electric column lately invented by J. A. de Luc. Also an account of several experiments made with it. (Philos. Mag., Ser. I., Vol. 35, pp. 205–210.) 8vo. *London, 1810*
Description of De Luc's *dry pile.*

2520. **Pasley,** (Sir) C(harles) W(illiam). (1780–1861.) Description of the French telegraphs used on the coasts of Flanders, etc., with observations on the same, and a plan of a polygrammatic telegraph on a new construction. (Philos. Mag., Ser. I., Vol. 35, pp. 339–341.) 1 plate. 8vo. *London, 1810*
Designs of mechanical or semaphore telegraphs.
—See also 2513.

2521. **Marum,** (Martin) van. (1750–1837.) Catalogue des plantes, cultivées au printemps de 1810 dans le jardin de M. van Marum à Harlem. 64 pp. 8vo. *Harlem, 1810*
Pamphlet of botanical interest written by the celebrated physicist.
—See also 461, 2542.

2522. **Walker,** A(dam). (1731–1821.) Analysis of a course of lectures in Natural and Experimental philosophy. Lectures VII & VIII: Electricity. 15. edition. pp. 52–59. 8vo. *London, 1810*
Notes of a lecture on electricity. "A theory of greater plausibility is that lightning comes originally from the sun." p. 55.
—See also 618.

2523. **Forster,** Thomas. On M. de Luc's electric column. (Philos. Mag., Ser. I., Vol. 37, pp. 424–425.) 1 plate. 8vo. *London, 1811*
Experiments with a "dry" pile in which its action is found to depend on the state of the weather. (See No. 2525.)
—See also 728, 5006.

2524. **Brande,** W(illiam) T(homas). (1788–1866.) On some new electro-chemical phenomena. (Philos. Trans. Roy. Soc., 1814, pp. 51–61.) 1 plate. 4to. *London, 1814*
Experiments on the electrical state of different flames.
—See also 2516.

2525. **De Luc,** J(ean) A(ndré). (1727–1817.) On the variable action of the electric column. (Philos. Mag., Ser. I., Vol. 44, pp. 248–253.) 8vo. *London, 1814*
The "electric column" here referred to is the author's *dry pile.* (See No. 2523.)
—See also 661.

2526. **Donovan,** M(ichael). (1790– ? .) Reflections on the inadequacy of the principal hypothesis to account for the phaenomena of electricity. (Philos. Mag., Ser. I., Vol. 44, pp. 334–351+401–407.) 1 plate. 8vo. *London, 1814*

Criticism of the Franklinian theory. "In the present dignified and improved state of natural science, everything should be rejected without reserve and without respect to authority that deviates from the standard of reason and experiment," p. 349. (See No. 2533.)

2526a.——Second reply to M. de Luc's observations in a paper entitled "Reflections," etc. (Philos. Mag., Ser. I., Vol. 46, pp. 13–14.) 8vo. *London, 1815*

—See also 730, 2960.

2527. **Howldy,** Thomas. Influence of atmospheric moisture on an electric column composed of discs of zinc and silver. (Philos. Mag., Ser. I., Vol. 43, pp. 363–364.) 8vo. *London, 1814*

—See also 2532.

2528. **Walker,** Ed. On electricity: in answer to M. Singer's remarks. (Philos. Mag., Ser. I., Vol. 43, pp. 364–365.) 8vo. *London, 1814*

Critical letter valuable only as a specimen of acrimonious writing. (See No. 725.)

2529. **Account** of an invention for reducing the expense of carriage on railways and other similar roads. 7 pp. 1 plate. 8vo. *Scarborough, 1814*

The invention consists of an endless chain passing over a driving pulley and round other pulleys fixed on the axles of the railway carriages. An illustration accompanies the letter.

2530. **Children,** J(ohn) G(eorge). (1777–1852.) An account of some experiments with a large voltaic battery. (Philos. Trans. Roy. Soc., 1815, pp. 363–374+409–415.) 4to. *London, 1815*

The battery consisted of 21 zinc-copper cells each plate having a surface of 32 square feet; experiments on the heating power of the battery; unable to charge a *Leyden jar* with the battery.

—See also 2517.

2531. **Crosse,** Andrew. (1784–1855.) Experiments in voltaic electricity. (Philos. Mag., Ser. I., Vol. 46, pp. 421–426.) 8vo. *London, 1815*

Deformation of a mercury globule when placed between the electrodes of a voltaic cell.

—See also 2538.

2532. **Howldy,** Thomas. On the fracture of electrical jars by spontaneous discharges. (Philos. Mag., Ser. I., Vol. 46, pp. 205–208.) 8vo. *London, 1815*

The author recognizes that a Leyden jar may be perforated when it *explodes spontaneously* as well as when discharged in the usual way.

2533.——On the Franklinian theory of the Leyden jar; with remarks on Mr. Donovan's experiments. (Philos. Mag., Ser. I., Vol. 46, pp. 401–408.) 8vo. *London, 1815*

The author justifies the Franklinian theory of the Leyden jar and criticises

the "fallacious experiments" of Mr. Donovan on the inadequacy of existing theories to account for the phenomena of electricity. (See No. 2526.)
—See also 2527.

2534. **Ronalds,** (Sir) Francis. (1788–1873.) On correcting the rate of an electric clock by a compensation for changes of temperature. (Philos. Mag., Ser. I., Vol. 46, pp. 203–204.) 8vo.
London, 1815

A "dry" pile used to compensate for changes of temperature; also reference to Zamboni's "dry" pile.

2535.— —On the electric column of Mr. De Luc. (Philos. Mag., Ser. I., Vol. 46, pp. 466–467.) 8vo. *London, 1815*
Note on the influence of moisture on the action of a "dry" pile.
—See also 803, 2570, 2873, 2923, 3253.

2536. **Singer,** G(eorge) J(ohn). (1786–1817.) Correction of some errors in Mr. Singer's paper on the mechanical applications of the electric column. (Philos. Mag., Ser. I., Vol. 46, pp. 11–12.) 8vo. *London, 1815*
Note correcting some typographical errors.

2537.— —Some account of the electrical experiments of M. de Nelis. (Philos. Mag., Ser. I., Vol. 46, pp. 259–264.) ill. 8vo.
London, 1815

Experiments analogous to those of Lichtenberg and Lullin; explosive effects of discharge.

2538. **Singer,** George John (1786–1817) & Andrew **Crosse** (1784–1855). Account of some electrical experiments by M. de Nelis, of Malines in the Netherlands, with an extension of them. (Philos. Mag., Ser. I., Vol. 46, pp. 161–166.) 1 plate. 8vo.
London, 1815

Experiments showing the explosive effect of strong electric discharges.
—See also 725, 2531, 2536.

2539. **Walker,** Ez(ekiel). New outlines of chemical philosophy. (Philos. Mag., Ser. I., Vol. 45, pp. 424–432.) 1 plate. 8vo.
London, 1815

Description with diagram of the author's repulsion "electro-meter," some experiments with the same.

2540. **MacDonald,** John. (1759–1831.) Treatise explanatory of a new system of naval, military and political telegraphic communication of general application in which a comprehensive numerical dictionary calculated to express all the simple, compound and potential inflections of the verb. 77 pp. ill. 19 plates. 8vo.
London, 1817

Signaling by means of flags.
—See also 2495.

2541. **Description** of the safety lamp invented by Stephenson and now in use in Killingworth Colliery. Added: Account of the lamp constructed by Humphry Davy. 16+8 pp. 5 plates. 12mo.
London, 1817

Some points of interest relating to the safety lamp.

2542. **Marum,** Martin van. (1750–1837.) Description d'une Marmite de Papin ou d'une chaudière qui retient la vapeur. 14 pp. 1 plate. 8vo. *Harlem, 1818*
Modified form of Papin's *digester.*
—See also 2521.

2543. **Davy,** (Sir) Humphry. (1778–1829.) Some observations on the formation of mists in particular situations. (Philos. Trans. Roy. Soc., 1819, pp. 123–144.) 1 plate. 4to. *London, 1819*
Deposition of moisture from the atmosphere in the vicinity of lakes and rivers.
—See also 2500.

2544. **Sabine,** (Sir) Edward. (1788–1883.) On irregularities observed in the direction of the compass needles of H. M. S. *Isabella* and *Alexander* in their late voyage of discovery and caused by the attraction of the iron contained in the ships. (Philos. Trans. Roy. Soc., 1819, pp. 112–133.) 1 plate. 4to. *London, 1819*
Observations made by Captain Flinders. (See No. 2558.)
—See also 945, 2558, 2633, 2642, 2698, 2710, 2715, 2772, 2784, 2788, 2808, 2829, 2852, 2874, 2907, 2941, 2978, 2986, 3036, 3068, 3105, 3145, 3254, 3314, 3363, 3413, 3471, 3515, 3589, 3647, 3672, 3702, 3795.

2545. **Scoresby,** William. (1789–1857.) On the anomaly in the variation of the magnetic needle as observed on ship-board. (Philos. Trans. Roy. Soc., 1819, pp. 96–106.) 4to. *London, 1819*
Capt. Flinders' rules.
—See also 805, 2559, 2582, 2670.

2546. **Young,** (Sir) Thomas. (1773–1829.) Remarks on the probabilities of error in physical observations, and on the density of the earth, considered especially with regard to the reduction of experiments on the pendulum. (Philos. Trans. Roy. Soc., 1819, pp. 70–95.) 4to. *London, 1819*
A point in the theory of probabilities; variation of *g* due to irregularities of the earth's surface.
—See also 643.

2547. **Christie,** S(amuel) H(unter). (1784–1865.) On the laws according to which masses of iron influence magnetic needles. (Philos. Trans. Roy. Soc., 1820, pp. 147–173.) 4to. *London, 1820*
The induced polarity of an iron mass is not considered sufficient to explain the behavior of a neighboring compass-needle; the experiments were made with a cast-iron ball which could be raised or lowered while the compass-needle could be placed on any radius, and its departure from the magnetic meridan estimated.
—See also 2565, 2597, 2603, 2619, 2625, 2673, 2703, 2720.

2548. **Davy,** (Sir) Humphry. (1778–1829.) On the magnetic phaenomena produced by electricity. (Philos. Mag., Ser. I., Vol. 58, pp. 43–50.) 8vo. *London, 1820*
In a foot-note, the author refers to *Romagnosi's* observation made in Trent

in 1802 that an insulated wire connected with the pole of a battery deflects a magnetic needle. *Mojon* of Genoa is quoted as having rendered a steel needle magnetic by placing it for a long time in a voltaic circuit. Compare Izarn, *Manuel du Galvanisme*, 1804. (See No. 664.)

2548a.——The same paper. (Philos. Trans. Roy. Soc., 1821, pp. 7–19.) 4to. *London, 1821*

2548b.——Sur les phénomenes magnétiques par l'électricité Extrait d'une léttre adressée à W. H. Wollaston. (Journ. Phys. Chim. et d'Hist. Nat., Vol. 93, pp. 226–240; Vol. 94, pp. 72–81.) 8vo. Paris, *1821–1822*

2548c.——Further research on the magnetic phaenomena produced by electricity, with some new experiments on the properties of electrified bodies in their relations to conducting powers and temperature. (Philos. Trans. Roy. Soc., 1821, pp. 425–439.) 4to. *London, 1821*

Magnetism developed in various conductors by the passage of the electric current; chain of *alternate links of silver and platinum.*

—See also 2500.

2549. **Faraday,** M(ichael). (1791–1867.) On the connexion of electric and magnetic phaenomena. (Quart. Journ. Sc., Vol. X, pp. 361–364.) 1 plate. 8vo. *London, 1820*

Paper written while Faraday was still assistant in the Royal Institution,

—See also 787, 2555 bis, 2705, 2762, 2801, 2834, 2849, 2961, 2998, 3089, 3172, 3445.

2550. **Electricity.** 64 pp. ill. 8vo. *London, 1820*(?)

Cyclopedia article on electricity.

2551. **Heat.** 64 pp. ill. 8vo. (*1820*?)

Article taken from an encyclopedia.

2553. **Hatchett,** (Charles). (1765–1847.) On the electro-magnetic experiments of MM. Oersted and Ampère. (Philos. Mag., Ser. I., Vol. 57, pp. 40–49.) 8vo. *London, 1821*

Condensed account of early electromagnetic experiments.

2554. **Kater,** Henry. (1777–1835.) On the best kind of steel and form for a compass needle. (Philos. Trans. Roy. Soc., 1821, pp. 104–129.) 4to. *London, 1821*

The Bakerian lecture for the year; the material recommended for compass needles is *clock-spring* and the form that of a *rhombus.*

2555. **Barlow,** Peter. (1776–1862.) On the anomalous magnetic action of hot iron between white and blood-red heat. (Philos. Trans. Roy. Soc., 1822, pp. 117–126.) 4to. *London, 1822*

It was noticed that there was a temperature at which iron attracted the magnetic needle in the contrary way to which it did when cold—*i.e.,* if the bar and compass were so situated that the N end of the needle was attracted to it when cold, the S end would be drawn to it at the said temperature.

—See also 720, 2563, 2571, 2595, 2617, 2654, 2672.

2555bis. **Faraday,** M(ichael). (1791–1867.) On some new electro-magnetical motions, and on the theory of magnetism. (Quart. Journ. Sc., Vol. xii, pp. 74–96.) 8vo. *London, 1822*

—See also 2549.

2556. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) Electrical conductors for ships. (Philos. Mag., Ser. I., Vol. 60, pp. 231–233.) 8vo. *London, 1822*

A brief note on lightning-conductors suitable for ships.

—See also 801, 2608, 2637, 2648, 2662, 2682, 2706, 2755, 2767, 2789, 2822, 2862, 2882, 2910, 2915, 3025, 3058, 3094, 3295, 3348, 5139.

2557. **Pasley,** (Sir) Charles William. (1780–1861.) Practical rules for making telegraphic signals, with a description of the two-armed telegraph invented in 1804. xi+59 pp. 8vo. *London, 1822*

Description of the author's mechanical telegraph.

—See also 2513.

2558. **Sabine,** (Sir) Edward. (1788–1883.) An account of experiments to determine the amount of the dip of the magnetic needle in London, in August 1821, with remarks on the instruments which are usually employed in such determinations. (Philos. Trans. Roy. Soc., 1822, pp. 1–21.) 4to. *London, 1822*

The experiments were made in the course of two voyages in search of a north-west passage in the years 1818 and 1819; ellipticity of the earth's deduced from observations of *g* made with a Kater's pendulum. (See No. 2544.)

—See also 2544.

2559. **Scoresby,** W(illiam). (1789–1857.) Experiments and observations on the development of magnetical properties in steel and iron by percussion. (Philos. Trans. Roy. Soc., 1822, pp. 241–252; 1824, pp. 197–221.) 4to. *London, 1822–1824*

Principal laws governing the development of magnetism in iron by percussion, filing, and bending.

—See also 2545.

2560. **Traill,** Thomas Stewart. (1781–1862.) Electro-magnetic experiments and observations. (Philos. Trans. Roy. Soc., 1822, pp. 465–480.) 1 plate. 4to. *London, 1822*

Experiments with "right" and "left handed" helices.

—See also 2584, 2686.

2561. **Ampère,** (André Marie). (1775–1836.) Mémoire sur la théorie mathématique des phénomènes électro-dynamiques uniquement déduite de l'expérience. (Mém. de l'Inst., Paris, Vol. VI, pp. 175–387.) 2 plates. 4to. *Paris, 1823*

In this volume, the author works out the mathematical theory of the mutual action of two elements of current.

—See also 762.

2562. **Avogadro,** (Conte de Quaregna), (Amadeo). (1776–1856.) Development of electricity by two pieces of the same metal. (Edinburgh Philos. Journ., Vol. 9, p. 396.) 8vo. *Edinburgh, 1823*

An experiment in thermo-electricity.

2563. **Barlow,** Peter. (1776–1862.) Observations and experiments on the daily variation of the horizontal and dipping needles under a reduced directive power. (Philos. Trans. Roy. Soc., 1823, pp. 326–341.) 1 plate. 4to. *London 1823*

It is suggested that the daily change depends more on the intensity of sunlight than on the temperature of the day.

—See also 2555.

2564. **Becquerel,** (Antoine César). (1788–1878.) Production of electricity by pressure. (Abstract.) (Edinburgh Philos. Journ., Vol. 9, p. 396.) 8vo. *Edinburgh, 1823*

A brief note on static electricity.

—See also 882, 2623, 2657, 2739, 3119, 3280, 3627, 3679, 3715, 3815.

2565. **Christie,** Samuel Hunter. (1784–1865.) On the diurnal deviations of the horizontal needle under the influence of magnets. (Philos. Trans. Roy. Soc., 1823, pp. 342–392.) 2 plates. 4to. *London, 1823*

The directive power of the earth was diminished by means of two bar-magnets placed on the line of dip; changes of temperature, a cause of "variation".

—See also 2547.

2566. **Davy,** (Sir) H(umphry). (1778–1829.) On a new phenomenon of electro-magnetism. (Philos. Trans. Roy. Soc., 1823, pp. 153–159.) 4to. *London, 1823*

Rotation of vertical conductors conveying a current, when placed in a strong magnetic field.

2566a.——(The same paper.) Abstract. (Edinburgh Philos. Journ., Vol. 10, pp. 185–186.) 8vo. *Edinburgh, 1824*

—See also 2500.

2567. **Hulls,** Jonathan (also **Hull**). (fl. 1737.) A description and draught of a newly invented machine, for carrying vessels or ships out of or into any harbour, port or river against wind and tide, or in a calm. (Edinburgh Philos. Journ., Vol. 9, pp. 274–278.) 1 plate. 8vo. *Edinburgh, 1823*

Description with illustrations of the author's *steamboat*. First published in 1737.

2568. **Pasley,** (Sir) Charles William. (1780–1861.) Observations on nocturnal signals in general, with a simple method of converting Lieut. Colonel Pasley's two-armed telegraph into a universal telegraph for day and night signals. 11+53 pp. 8vo. *Chatham, 1823*

Night-signals by means of transparencies.

—See also 2513.

2569. **Pepys,** W(illiam) H(asledine). (1775–1856.) An account of an apparatus on a peculiar construction for performing electro-magnetic experiments. (Philos. Trans. Roy. Soc., 1823, pp. 187–188.) 1 plate. 4to. *London, 1823*

The apparatus consisted of plates of copper and zinc rolled round a wooden cylinder and insulated from each other with means for facilitating their immersion in an active liquid.

2570. **Ronalds,** (Sir) (Francis). (1788–1873.) Account of Ronalds' pendulum-doubler of electricity. (Edinburgh Philos. Journ., Vol. 9, pp. 322–325.) 8vo. *Edinburgh, 1823*

Device for keeping Ronalds' telegraph wire constantly electrified from a small source of electricity. In 1816 Ronalds sent intelligible messages over eight miles of an insulated air-line by means of the divergence of the pith-balls of an electroscope. (See Nature, Nov. 23, 1871.)

2570bis.——Improvements in electrical machines. (Edinburgh Philos. Journ., Vol. 9, pp. 395–396.) 8vo. *Edinburgh, 1823*

Note on the increased efficiency of the frictional machine when the rubber is kept warm.

—See also 2534.

2571. **Barlow,** Peter. (1776–1862.) A popular view of Barlow's magnetical experiments and discoveries, particularly as they have been rendered applicable to the correction of the local attraction of vessels. (Edinburgh Philos. Journ., Vol. 11, pp. 65–87.) 8vo. *Edinburgh, 1824*

Observations of Capt. Flinders; Barlow's correcting plate. (See No. 765a.)

—See also 2555.

2572. **Cumming,** James. (1777–1861.) Table of thermo-electrics. (Edinburgh Philos. Journ., Vol. 11, p. 85.) 8vo. *Edinburgh, 1824*

—See also 778, 2621.

2573. **Davy,** (Sir) H(umphry). (1778–1829.) On the corrosion of copper sheathing by sea-water, and on methods of preventing this effect; and on their application to ships of war and other ships. (Philos. Trans. Roy. Soc., 1824, pp. 151–158.) 4to. *London, 1824*

Zinc and iron recommended for the preservation of copper sheathing.

2573a.——Additional experiments and observations on the application of electrical combinations to the preservation of the copper sheathing of ships and to other purposes. (Philos. Trans. Roy. Soc., 1824, pp. 242–246.) 4to. *London, 1824*

Cast iron is considered to be well adapted for the protection of the copper sheathing of ships.

2573b.——Further researches on the preservation of metals by electro-chemical means. (Philos. Trans. Roy. Soc., 1824, pp. 328–346.) 1 plate. 4to. *London, 1825*

Nails of zinc and iron are recommended.

—See also 2500.

2574. **(Delambre,** Jean Baptiste Joseph.) (1749–1822.) Faits nouveaux relatifs à l'aimantation découverte par M. Arago. (Mém. Acad. Sc., Inst. France, Vol. 4, cxlix–clii.) 4to. *Paris, 1824*

Copper wire conveying a current attracts iron filings; sewing needle magnetized by current; consequent poles.

2575. **Doebereiner,** (Johann Wolfgang). (1780–1849.) Account of some remarkable and newly discovered properties of the sub-oxide of platina, the oxide of the sulphuret, and the metallic powder of platina. (Philos. Mag., Ser. I, Vol. 63, pp. 153–156.) 8vo. *London, 1824*

The absorption of hydrogen by platinum and the formation of water or ammonia from oxygen or nitrogen said to be due to a supposed electrochemical element formed by the platinum and the hydrogen.

2575bis. **Hansteen,** (Christopher). (1784–1873.) Remarks made during part of a journey in the summer of 1821. (Edinburgh

Philos. Journ., Vol. 10, pp. 207–208.) 8vo. *Edinburgh, 1824*
Magnetic observations made on a trip from Christiania to Bergen.
—See also 756, 3450.

2576. **Harvey,** G(eorge). (? –1834.) Experimental inquiries relative to the distribution and changes of the magnetic intensity in ships of war. (Philos. Trans. Roy. Soc., 1824, pp. 310–353.) 5 plates. 4to. *London, 1824*
Variation in the intensity of magnetic forces in selected brigs and frigates; the intensity was estimated in planes parallel to the decks.

2577. ——Remarks on the influence of magnetism on the rates of chronometers. (Edinburgh Philos. Journ., Vol. 10, pp. 1–11, 342–346.) 8vo. *Edinburgh, 1824*
—See also 2609.

2578. **Herschel,** (Sir) J(ohn) F(rederick) W(illiam). (1791–1871.) On certain motions produced in fluid conductors when transmitting the electric current. (Philos. Trans. Roy. Soc., 1824, pp. 162–196.) 4to. *London, 1824*
The Bakerian lecture; special reference to the bodily motions of small masses of mercury.

2578a. ——(The same paper.) Abstract. (Annals of Philosophy, Vol. 8, pp. 271–286.) 8vo. *London, 1824*
—See also 1459, 2594.

2579. **Leslie,** John. (1766–1832.) Observations on electrical theories. (Edinburgh Philos. Journ., Vol. 11, pp. 1–39.) 8vo. *Edinburgh, 1824*
"Electricity is a state or condition of which every species of matter is susceptible", p. 38.

2580. **Oersted,** J(ohannes) C(hristianus). (1770–1851.) A paradoxical galvanic experiment. (Edinburgh Philos. Journ., Vol. 10, pp. 205–207.) 8vo. *Edinburgh, 1824*
The author of this note was the famous Professor of natural philosophy in the University of Copenhagen, and discoverer of the magnetic effect of the electric current.
—See also 773.

2582. **Scoresby,** William. (1789–1857.) Magnetical experiments, designed to illustrate the manner of the existence of the magnetical principle in ferruginous bodies and the mode of its development. (Edinburgh Philos. Journ., Vol. 11, pp. 355–359.) 8vo. *Edinburgh, 1824*
Results of experiments with a magnetized wire divided into equal parts, showing that the magnetic intensity is greatly increased by placing these magnets end to end as compared with the usual parallel arrangement of compound magnets. From these he concludes that magnetization "simply consists in giving arrangement to the magnetic particles."
—See also 2545.

2583. **Seguin,** (Armand). (1765(?)–1835.) Observations on the effects of heat and motion. (Edinburgh Philos. Journ., Vol. 10, pp. 280–283.) 8vo. *Edinburgh, 1824*

2584. **Traill,** Thomas S(tewart). (1781–1862.) On thermo-magnetism. (Edinburgh Philos. Journ., Vol. 11, pp. 258–263.) 8vo.
Edinburgh, 1824
Thermo-electric currents obtained from pairs of antimony, bismuth and copper; the earth considered as a vast thermo-electric generator.
—See also 2560.

2585. **Wheatstone,** (Sir) Charles. (1802–1875.) Harmonic diagram. (Card.) 8vo. *1824*
Interesting to students of harmony. Early in life, Wheatstone was a manufacturer of musical instruments.
—See also 2183, 2687, 2716, 2812, 3012, 3378, 3427, 3486, 3570, 3573, 3854, 4409, 4460, 4987, 4991, 4993, 4995 bis b, 5018, 5036, 5050.

2586. **Wollaston,** (William Hyde). (1766–1828.) Note on the magnetizing of titanium, cobalt and nickel. (Abstract, Edinburgh Philos. Journ., Vol. 10, pp. 183–184.) 8vo. *Edinburgh, 1824*

2587. ——On semi-decussation of the optic nerves. (Philos. Trans. Roy. Soc., 1824, pp. 222–231.) 4to. *London, 1824*
Course by which impressions from images are conveyed to the brain; also structure of the optic nerve on which the communication of the impressions depends.
—See also 2501.

2588. **Zuylen van Nyevelt,** P. H. (1783–1825.) Notice respecting some new electro-magnetic phenomena. (Edinburgh Philos. Journ., Vol. 10, pp. 130–138.) 8vo. *Edinburgh, 1824*
Effect of the electric current on the dipping needle.

2589. **Electricity** produced by separation of parts. (Edinburgh Philos. Journ., Vol. 10, p. 185.) 8vo. *Edinburgh, 1824*
Electrical effects due to breaking Prince Rupert's drops, crushing sugar, and tearing cotton cloth.

2590. **Experiments** of Mr. Barlow and Mr. Christie on the diurnal variation of the needle. (Edinburgh Philos. Journ., Vol. 10, pp. 184–185.) 8vo. *Edinburgh, 1824*
Note on the author's paper on the diurnal variation of the needle.

2591. **Popular view** of Mr. Barlow's magnetical experiments and discoveries, particularly as they have been rendered applicable to the correction of the local attraction of vessels. (Edinburgh Philos. Journ., Vol. 11, pp. 65–87.) 8vo.
Edinburgh, 1824
Extensive treatment of the compass errors arising from the magnetism of the ship.

2592. **Structure** of electric organs of the gymnotus electricus. (Edinburgh Philos. Journ., Vol. 11, p. 221.) 8vo. *Edinburgh, 1824*
A brief note: "If we compare the electric organs of the torpedo and the gymnotus electricus, the first may be compared with the voltaic pile the second with the trough apparatus."

2593. **Tables** of the variation of the magnetic needle in different parts of the globe. (Edinburgh Philos. Journ., Vol. 10, pp. 283–284.) 8vo. *Edinburgh, 1824*
The observations relate to Asia and adjacent islands.

2594. **Babbage,** C(harles) (1792–1871) & (Sir) J(ohn) F(rederick) W(illiam) **Herschel** (1791–1871). Account of the repetition of M. Arago's experiments on the magnetism manifested by various substances during the act of rotation. (Philos. Trans. Roy. Soc., 1825, pp. 467–496.) 2 plates. 4to. *London, 1825*

Effect of bodies placed as screens between the magnet and the rotating copper disc; time found to be an essential element in magnetic induction.
—See also 2578, 2601.

2595. **Barlow, Peter.** (1776–1862.) On the laws of electro-magnetic action, as depending on the length and dimensions of the conducting wire, and on the question, whether electrical phenomena are due to the transmission of a single or a compound fluid. (Edinburgh Philos. Journ., Vol. 12, pp. 105–114.) 8vo. *Edinburgh, 1825*

Experiments on the conducting power of different wires, with remarks on Franklin's one-fluid theory.

2596.— —On the temporary magnetic effect induced in iron bodies by rotation. (Philos. Trans. Roy. Soc., 1825, pp. 317–327.) 4to. *London, 1825*

Effect on a compass needle of rotating an iron ball; a 13-inch mortar shell was used.
—See also 2555.

2597. **Christie,** Samuel Hunter. (1784–1865.) On the effects of temperature on the intensity of magnetic forces; and on the diurnal variation of the terrestrial magnetic intensity. (Philos. Trans. Roy. Soc., 1825, pp. 1–65.) 1 plate. 4to. *London, 1825*

Details of numerous experiments made to ascertain the effect of changes of temperature on the strength of magnets; diurnal variations in terrestrial magnetic intensity deduced.

2598.— —On the magnetism of iron arising from its rotation. (Philos. Trans. Roy. Soc., 1825, pp. 347–417.) 2 plates, 5 tables. 4to. *London, 1825*

Action of a rotating plate of iron on a magnetic needle with description of apparatus and experiments.

2599.— —On the magnetism developed in copper and other substances during rotation. (Philos. Trans. Roy. Soc., 1825, pp. 497–509.) 4to. *London, 1825*

Experiments made with a horse-shoe magnet suspended over a rotating copper disc.
—See also 2547.

2600. **An account** of the experiment of Barlow of the Royal Military Academy and those of Arago, on the magnetism induced or exhibited in iron, and in other metals, by rotation, with some new experiments on the same subject, by James Marsh. (Edinburgh Philos. Journ., Vol. 13, pp. 119–125.) 8vo. *Edinburgh, 1825*

A heavy iron shell making 720 revolutions per minute was used in the experiments.

2601. **Babbage,** Charles. (1792–1871.) On electrical and magnetic rotations. (Philos. Trans. Roy. Soc., 1826, pp. 494–528.) 4to. *London, 1826*

Importance of the influence of *time* on magnetic phenomena depending on the rotation of some part of the apparatus used.

—See also 2594.

2602. **Biot,** J(ean) B(aptiste). (1774–1862.) Magnetism. (Encyclopaedia Metropolitana, 2nd. edition, pp. 246–280.) 2 plates. 4to. *London, (1826)*

—See also 633.

2603. **Christie,** Samuel Hunter. (1784–1865.) On magnetic influence in the solar rays. (Philos. Trans. Roy. Soc., 1826, pp. 219–239+379–396.) 4to. *London, 1826*

It is held that solar rays possess magnetic properties independently of the heat which they impart.

—See also 2547.

2604. **Davy,** (Sir) H(umphry). (1778–1829.) On the relations of electrical and chemical changes. (Philos. Trans. Roy. Soc., 1826, pp. 383–422.) 4to. *London, 1826*

Historical review of electro-chemical decomposition; chemical changes which take place in a voltaic battery.

—See also 2500.

2605. **Foster,** Henry. (1797–1831.) A comparison of the diurnal changes of intensity in the dipping and horizontal needles at Port Bowen. (Philos. Trans. Roy. Soc., 1826, pp. 177–187.) 4to. *London, 1826*

A magnetic needle is mounted (1) as a dipping needle and (2) as a horizontal one; it is then vibrated for the purpose of studying the diurnal change in the terrestrial magnetic intensity.

2606.— —Account of the repetition of Mr. Christie's experiments on the magnetic properties imparted to an iron plate by rotation, at Port Bowen in May and June, 1825. (With Christie's remarks thereon.) (Philos. Trans. Roy. Soc., 1826, part IV, pp. 188–205.) 4to. *London, 1826*

Effect on the compass of rotating an iron plate.

—See also 2629.

2607. **Guillemin,** (Amédée). Magnetism. (Dict. class. d'hist. nat., Vol. 10, pp. 25–30.) 8vo. *Paris, 1826*

2608. **Harris,** (Sir) William Snow. (1792–1867.) On the relative powers of various metallic substances as conductors of electricity. (Philos. Trans. Roy. Soc., 1826, pp. 18–24.) 1 plate. 4to. *London, 1826*

Relation of the heat evolved to the conductivity of the metal connecting the poles of a battery.

—See also 2556.

2609. **Harvey,** George. (? –1834.) On a remarkable case of magnetic intensity in a chronometer. (Trans. Roy. Soc., Edinburgh, Vol. 10, pp. 117–126.) 4to. *Edinburgh, 1826*

Investigation of the magnetic condition of a chronometer and its spring.

—See also 2576.

2610. **Poisson,** (Siméon Denis). (1781–1840.) Mémoire sur la théorie du magnétisme en mouvement. (Mém. Acad. Sc. Paris, Vol. 6, pp. 441–570.) 4to. *Paris, 1826*
Mathematical study of magnetism due to rotation.
—See also 718, 2748.

2611. **Roget,** P(eter) M(ark). (1779–1869.) Galvanism. (Encyclopaedia Metropolitana, pp. 173–224.) 1 plate. 4to. *London, 1826*
Extensive discussion of the various theories of galvanism; some powerful voltaic batteries.
—See also 871.

2612. **Savary,** (Savart) F(élix). (1797–1841.) Mémoire sur l'aimantation. (Ann. Chim. et Phys., Vol. 31, pp. 5–57.) 8vo. *Paris, 1826*
Strength of magnets, nature of magnetism.
—See also 804.

2613. **Somerville,** (Mrs.) M(ary) Fairfax. (1780–1872.) On the magnetizing power of the more refrangible solar rays. (Philos. Trans. Roy. Soc., 1826, part II, pp. 132–139.) 4to. *London, 1826*
Supposed magnetic effect of the *violet* rays of sunlight.
—See also 890.

2614. **Electricity.** (Encyclopaedia Metropolitana, 2nd edition, pp. 41–172.) 5 plates. 4to. *London, 1826*

2615. **Electro-magnetism.** (Quarterly Review, Vol. 35, pp. 237–269.) 8vo. *London, 1826*
General exposition of facts; Ampère's experiments and theory.

2616. **On the noises** that sometimes accompany the aurora borealis. (Edinburgh New Philos. Journ., Vol. 1, pp. 156–159.) 8vo. *Edinburgh, 1826*
Musschenbroek, Nairne and Cavallo are quoted as having heard peculiar noises during auroral displays.

2617. **Barlow,** Peter. (1776–1862.) Account of the observations and experiments made on the diurnal variation and intensity of the magnetic needle by Captain Parry, Lieutenant Foster, and Lieutenant Ross, in Captain Parry's Third Voyage, with remarks and illustrations. (Edinburgh New Philos. Journ., Vol. 2, pp. 347–365.) 1 plate. 8vo. *Edinburgh, 1827*
These interesting observations were made from December 1824 to May 1825.

2618.— —On the secondary deflections produced in a magnetized needle by an iron shell, in consequence of an unequal distribution of magnetism in its two branches. (Philos. Trans. Roy. Soc., 1827, pp. 276–285.) 4to. *London, 1827*
Experiments made with a 13-inch mortar-shell which could be raised or lowered and a compass-needle which could be carried about it in a circle.
—See also 2555.

2619. **Christie,** S(amuel) H(unter). (1784–1865.) On the mutual action of the particles of magnetic bodies, and on the law of

variation of the magnetic forces generated at different distances during rotation. (Philos. Trans. Roy. Soc., 1827, pp. 71–121.) 1 plate. 4to. *London, 1827*

Experiments made with a flat copper ring suspended over the poles of a revolving horse-shoe magnet.

2620.——Theory of the diurnal variation of the magnetic needle. (Philos. Trans. Roy. Soc., 1827, pp. 308–354.) 1 table. 4to. *London, 1827*

Thermo-electric experiments made with a compound ring of bismuth and copper; application to terrestrial magnetism.

—See also 2547.

2621. **Cumming,** J(ames). (1777–1861.) On the development of electromagnetism by heat. (Trans. Cambridge Philos. Soc., Vol. 2, pp. 47–75.) 4to. *Cambridge, 1827*

Short account of the author's researches in ***thermo-electricity.***

—See also 2572.

2622. **Electricity.** Part I. (Library of Useful Knowledge, No. 15.) 32 pp. ill. 8vo. *London, 1827*

2623. **Becquerel,** (Antoine César). (1788–1878.) On the electrical phenomena caused by the rubbing of metals with each other. (Edinburgh New Philos. Journ., Vol. 6, pp. 133-184.) 8vo. *Edinburgh, 1828*

List of metals examined and arranged so that each one is negative to those that follow it.

2624.——Relations between electricity and heat. (Edinburgh New Philos. Journ., Vol. 5, pp. 188–189.) 8vo. *Edinburgh, 1828*

Note on electrification produced by heating glass, gum-lac, tourmaline.

—See also 2564.

2625. **Christie,** S(amuel) H(unter). (1784–1865.) On the laws of the deviation of magnetized needles towards iron. (Philos. Trans. Roy. Soc., 1828, pp. 325–360.) 4to. *London, 1828*

Action of a mass of iron on the horizontal and the dipping needle; mathematical theory.

—See also 2547.

2626. **Dalton,** John. (1766–1844.) On the height of the aurora borealis above the surface of the earth; particularly the one seen on the 29th of March, 1826. (Philos. Trans. Roy. Soc., 1828, pp. 291–302.) 1 plate. 4to. *London, 1828*

The author of this paper was the celebrated chemist and founder of the modern atomic theory.

—See also 582, 2722.

2627. **De la Rive,** Aug(uste Arthur). (1801–1873.) Recherches sur la cause de l'électricité voltaique. (Mém. Soc. Phys. et d'Hist. Nat. Genève, Vol. 4, pp. 285–334.) 4to. *Geneva, 1828*

2627a.——(English translation.) (Philos. Mag., Ser. II, Vol. 11, pp. 274–299.) 8vo. *London, 1837*

The author defends the chemical theory of the voltaic cell.

—See also 818, 2860, 3085, 3285, 3392, 3441, 3537.

2628. **Ermann,** G(eorg) A(dolph). (1806–1877.) Essai sur la direction et l'intensité de la force magnétique à St. Petersbourg. (Mém. Sav. Etrang. Acad. Sc. St. Petersbourg, Vol. 1, pp. 97–129.) 4to. *St. Petersburg, 1828*

—See also 3698.

2629. **Foster,** Henry. (1797–1831.) A comparison of the changes of magnetic intensity throughout the day in the dipping and horizontal needles at Treurenburgh Bay in Spitzbergen. (Philos. Trans. Roy. Soc., 1828, pp. 303–311.) 4to. *London, 1828*

The needles were vibrated at different times of the day to determine to what extent each was affected.

—See also 2605.

2630. **Kemp,** K(enneth) T. (1806?–1843.) On a new galvanic trough. (Edinburgh New Philos. Journ., Vol. 5, pp. 80–75.) 8vo. *Edinburgh, 1828*

The elements of this battery are pure mercury and an amalgam of mercury and zinc.

—See also 2638.

2631. **Richardson,** John. (1787–1865.) On the aurora borealis. (Edinburgh New Philos. Journ., Vol. 5, pp. 241–243.) 8vo. *Edinburgh, 1828*

Height of the aurora; general appearance; gold-leaf electroscope not affected. The observations were made continuously for a period of six months in a high latitude.

2632. **Ritchie,** W(illiam). (? –1837.) Experiments and observations on electrical conduction. (Philos. Trans. Roy. Soc., 1828, pp. 373–387.) 4to. *London, 1828*

Conductivity of rarefied gases, heated vapors, hot and cold iron.

—See also 2641, 2669, 2677.

2633. **Sabine,** (Sir) Edward. (1788–1883.) Experiments to ascertain the ratio of the magnetic forces acting on a needle suspended horizontally in Paris and in London. (Philos. Trans. Roy. Soc., 1828, pp. 1–14.) 4to. *London, 1828*

The determinations were made at Chiswick (London) and Paris, cylindrical magnets suspended by a silk fibre being employed.

—See also 2544.

2634. **On electricity.** (Scientific Irrigator, 1828, pp. 282–475.) 12mo. *Edinburgh, 1828*

2635. **Motions** of the magnetic equator. (Abstract of paper by M. Morellet.) (Edinburgh New Philos. Journ., Vol. 5, pp. 190–191.) 8vo. *Edinburgh, 1828*

Note on M. Morellet's memoir on the position of the magnetic equator.

2636. **Farquharson,** James. (1781–1843.) On a definitive arrangement, and order of the appearance and progress of the Aurora Borealis; and on its height above the surface of the earth. (Philos. Trans. Roy. Soc., 1829, pp. 103–125.) 4to. *London, 1829*

—See also 2646, 2753.

2637. **Harris,** (Sir) William Snow. (1792–1867.) Experimental inquiries concerning the laws of magnetic forces. (Trans. Roy. Soc., Edinburgh, Vol. 11, pp. 277–321.) 3 plates. 4to.
Edinburgh, 1829

Description of an instrument by means of which the author studied the fundamental laws of magnetic phenomena.
—See also 2556.

2638. **Kemp,** K(enneth) T. ((1806?–1843.) Description of an improved blowpipe.—On the ascent of mercury on wires of iron. —Experiments on the electromagnetic properties of carbon when in a state of combustion. (Edinburgh New Philos. Journ., Vol. 6, pp. 340–344.) 8vo. *London, 1829*

Carbon while undergoing "combustion" is a good electrical conductor.
—See also 2630.

2639. **Moser,** Ludwig (Ferdinand) (1805–1880) & Peter (Theophil) **Riess** (1804–1883). Ueber den Einfluss der Waerme auf den Magnetismus. (Ann. Phys. u. Chem., Vol. 93, pp. 403–434.) 8vo. *Berlin, 1829*

Temperature coefficient of magnets.
—See also 2696, 3250.

2640. **Pohl,** G(eorg) F(riedrich). (1788–1849.) Der Prozess der galvanischen Kette. (Jahrbuecher f. Wissensch. Kritik, 1829, pp. 110–272.) 4to. *Berlin, 1829*

Reactions in the voltaic battery: theory.
—See also 825.

2641. **Ritchie,** W(illiam). (? –1837.) An experimental examination of the electric and chemical theories of galvanism. (Philos. Trans. Roy. Soc., 1829, pp. 361–366.) 4to. *London, 1829*

Weak points of Volta's contact theory; argument in favor of a modified chemical theory.
—See also 2632.

2642. **Sabine,** (Sir) Edward. (1788–1883.) On the dip of the magnetic needle in London in August 1828. (Philos. Trans. Roy. Soc., 1829, pp. 47–53.) 1 plate. 4to. *London, 1829*

The determination was made at Chiswick (London) with a needle specially constructed to avoid errors arising from non-coincidence of the centres of gravity and suspension.
—See also 2544.

2643. **Watt,** Mark. Description of a new instrument (proposed to be named a magnetometer) for measuring the different degrees of magnetic intensity that are exhibited during the day, throughout the year, and at various parts of the globe. (Edinburgh New Philos. Journ., Vol. 6, pp. 376–379.) 8vo.
Edinburgh, 1829

The instrument consisted of two small pivoted magnets with similar poles opposite each other.

2644.— —Notice of an experiment which proves that the magnetic needle does not point North and South; but only when it is suspended in a position approaching to the horizontal, or so that it cannot show its natural bearings. (Edinburgh New Philos. Journ., Vol. 6, pp. 379–382.) 8vo.

Edinburgh, 1829

The author thinks that there are grounds for believing that the sun, the moon and planets exert a magnetic effect.

2645. **Magnetism.** (Encyclopaedia Metropolitana, pp. 735–847.) 4to. *London, 1829*

An extract from Cavallo's "Treatise on Magnetism" is given in the article, containing a reference to the letter of *Petrus Peregrinus*, p. 737. (See No. 46, 235, 540.)

2646. **Farquharson,** James. (1781–1843.) Experiments on the influence of the Aurora Borealis on the magnetic needle. (Philos. Trans. Roy. Soc., 1830, pp. 97–115.) 4to. *London, 1830*

Matters connected with the physics of the aurora borealis are incidentally treated.

—See also 2636.

2647. **Fox,** Robert Were. (1789–1877.) On the electro-magnetic properties of metalliferous veins in the mines of Cornwall. (Philos. Trans. Roy. Soc., 1830, pp. 399–414.) 4to. *London, 1830*

Electrical currents due to mineral veins and internal heat.

—See also 2661, 2694, 2740, 2763.

2648. **Harris,** (Sir) W(illiam) S(now). (1792–1867). On the utility of fixing lightning conductors on ships. 23 pp. 1 plate. 8vo. *Plymouth, 1830*

Nature of a thunder-storm; numerous instances of ships being struck by lightning.

2648a.— —(The same paper.) (Edinburgh New Philos. Journ., Vol. 11, pp. 154–167+305–316.) 8vo. *Edinburgh, 1831*

—See also 2556.

2649. **Quetelet,** (Lambert) A(dolphe Jacques). (1796–1874.) Recherches sur l'intensité magnétique de différens lieux de l'Allemagne et des Pays-Bas. (Mém. Acad. Sc., Belgique, Vol. 6.) 18 pp. 4to. *Brussels, 1830*

Supplement to the work of Hansteen and Sabine (see No. 756, 945), magnetic observations made in Germany and the Netherlands.

2650.— —Recherches sur l'intensité magnétique en Suisse et en Italie. (Mém. Acad. Sc., Belgique, Vol. 6.) 16 pp. 4to.

Brussels, 1830

Instrument for observing directly the total magnetic force; also its advantages.

—See also 968, 2761, 2905, 2922.

2651. **Riess,** P(eter Theophil) (1804–1883) & (Ludwig Ferdinand) **Moser** (1805–1880). Ueber die taegliche Veraenderung der magnetischen Kraft und weitere Ausfuehrung der Poisson'-

schen Methode, die Intensitaet des Erdmagnetismus zu messen. (Ann. Phys. u. Chem., Vol. 95, pp. 161–179.) 8vo.
Berlin, 1830

Hourly variation of the total intensity of the earth's magnetic force.
—See also 2696, 3250.

2652. **Galvanism.** (Edinburgh Encyclopaedia, Vol. 10, pp. 79–102.) 4to. *Edinburgh, 1830*

2653. **Telegraph.** (Edinburgh Encyclopaedia, Vol. 18, pt. 2, 533–539.) 2 plates. 4to. *Edinburgh, 1830*

The paper relates to mechanical telegraphs only.

2654. **Barlow,** Peter. (1776–1862.) On the probable electric origin of all the phenomena of terrestrial magnetism. (Philos. Trans. Roy. Soc., 1831, pp. 41–50+99–108.) 4to. *London, 1831*

The laws of terrestrial magnetism are inconsistent with those of a permanent magnetic body, but are coincident with those of a body in a transient state of magnetic induction; the author's terrella of 1824 representing all the phenomena of terrestrial magnetism.

2655.——On the errors in the course of vessels, occasioned by local attraction; with some remarks on the recent loss of His Majesty's ship *Thetis.* (Philos. Trans. Roy. Soc., 1831, pp. 215–221.) 4to. *London, 1831*

Rules concerning the amount and direction of the deflecting force due to the iron masses of ships.

2655a.——Sur l'attraction locale des vaisseaux. Traduit par M. Coulier. (Bull. Soc. Geogr., Ser. I, 1831, pp. 205–211.) 8vo.
Paris, 1831

Extracts from the author's paper on the "deviation" of the compass. (See No. 7654.)
—See also 2555.

2656. **Barry,** Alexander. (? –1832.) On the chemical action of atmospheric electricity. (Philos. Trans. Roy. Soc., 1831, pp. 165–166.) 4to. *London, 1831*

Experiment made with atmospheric electricity obtained by means of a kite, Aug. 1824.

2657. **Becquerel,** (Antoine César). (1788–1878.) Mémoire sur le pouvoir thermo-électrique des métaux. (Mém. Acad. Sc. Paris, Vol. 10, pp. 237–258+271–285.) 4to. *Paris, 1831*

Theory and development of thermo-electric currents.

2658.——Mémoire sur les sulfures, iodures, bromures, etc. metalliques. (Mém. Acad. Sc., Paris, Vol. 10, pp. 259–270.) 4to.
Paris, 1831

Chemical paper on metallic sulphides.

2659.——Mémoire sur un procédé électro-chimique pour retirer le manganèse et le plomb des dissolutions dans lequelles ils se trouvent. (Mém. Acad. Sc. Paris, Vol. 10, pp. 286–292.) 4to.
Paris, 1831

Brief note describing the author's method for extracting manganese and lead from solutions.
—See also 2564.

2660. **Davy,** Edmund. (1785–1857.) On a simple electro-chemical method of ascertaining the presence of different metals; applied to detect minute quantities of metallic poisons. (Philos. Trans. Roy. Soc., 1831, pp. 147–164.) 4to. *London, 1831*

In electrolytic decomposition, the author recognizes that the metals are attracted by negatively electrified metallic surfaces and repelled by positively electrified surfaces with forces sufficiently energetic to overcome chemical affinity.

2661. **Fox,** Robert Were. (1789–1877.) On the variable intensity of terrestrial magnetism and the influence of the Aurora Borealis upon it. (Philos. Trans. Roy. Soc., 1831, pp. 199–207.) 4to. *London, 1831*

"It is evident that the elevation of the aurora must often be exceedingly great, probably much more than *a thousand miles.*"
—See also 2647.

2662. **Harris,** (Sir) W(illiam) S(now). (1792–1867.) On the transient magnetic state of which various substances are susceptible. (Philos. Trans. Roy. Soc., 1831, pp. 67–90.) 2 plates. 4to. *London, 1831*

Every kind of matter is considered to be more or less susceptible of a state of transient magnetism, arising from induction; remarks on Barlow's observation that a hollow sphere of iron exerts the same influence on a compass-needle as if it were a solid mass.

2663.——On the influence of screens in arresting the progress of magnetic action. (Philos. Trans. Roy. Soc., 1831, pp. 497–500.) 1 plate. 4to. *London, 1831*

Magnetic screening possesses great scientific interest and "if fully investigated is not unlikely to make us further acquainted with one of the agencies on which the phenomena of attraction may depend."

2664.——On the power of masses of iron to control the attractive force of a magnet. (Philos. Trans. Roy. Soc., 1831, pp. 501–506.) 1 plate. 4to. *London, 1831*

Some experiments on magnetic screening.
—See also 2556.

2665. **On the influence** of lightning conductors on vegetation. (Edinburgh New Philos. Journ., Vol. 11, pp. 386–388.) 8vo. *Edinburgh, 1831*

Experiments showing that plants do not grow more vigorously near a lightning-conductor.

2666. **Davy,** John. (1790–1868.) An account of some experiments and observations on the torpedo. (Philos. Trans. Roy. Soc., 1832, pp. 259–278.) 4to. *London, 1832*

Experiments on the magnetizing, heating and chemical effects of the electricity of the torpedo, with remarks on the electrical organs of the fish; Walsh's experiments of 1772.
—See also 2679, 2693, 3170.

2667. **Henry,** Joseph. (1797–1878.) On a disturbance of the earth's magnetism, in connection with the appearance of an aurora

borealis, as observed at Albany, April 19th, 1831. (N. Y. Senate Papers, 1831, pp. 107–119.) 8vo. *Albany, 1832*
The aurora was visible in Europe; determination of the magnetic disturbance in England by Christie, p. 115.
—See also 1002, 2724, 2756, 2917, 2937, 3135.

2668. **Papen,** A. Topographischer Atlas des Koenigreiches Hannover und Herzogthums Braunschweig. 80 maps. 46x33 cm. *Hanover, 1832–1847*
Sectional topographical map of Hanover, Germany, with dedication by George V., King of Hanover, to Mr. Clark.

2669. **Ritchie,** William. (? –1837.) Experimental researches in voltaic electricity and electro-magnetism. (Philos. Trans. Roy. Soc., 1832, pp. 279–298.) 1 plate. 4to. *London, 1832*
Theory and laws of the action of the voltaic battery.
—See also 2632.

2670. **Scoresby,** William. (1789–1857.) On the uniform permeability of all known substances to the magnetic influence, and the application of the fact in engineering and mining, for the determination of the thickness of solid substances not otherwise measurable. (Edinburgh New Philos. Journ., Vol. 13, pp. 97–132.) 8vo. *Edinburgh, 1832*
Law of distance and its application to the determination of the thickness of a wall or mass of rock.
—See also 2545.

2671. **Arago,** (Dominique François Jean). (1786–1853.) Éloge historique d'Alexandre Volta. (Mém. Acad. Sc. Paris, Vol. 12 (Hist.), pp. 58–104.) 4to. *Paris, 1833*
In this panegyric of Volta, reference is made to Franklin's kite, evaporation and atmospheric electricity; electricity due to contact; the electrophorus and the voltaic battery, "the most marvelous instrument created by the mind of man".

2671a.— —(English translation.) Historical stage of Alexander Volta. (Edinburgh New Philos. Journ., Vol. 16, pp. 1–33.) 8vo. *London, 1834*
—See also 915, 2751.

2672. **Barlow,** Peter. (1776–1862.) On the present situation of the magnetic lines of equal variation, and their changes on the terrestrial surface. (Philos. Trans. Roy. Soc., 1833, pp. 667–673.) 2 plates. 4to. *London, 1833*
Isogonic lines with map; the first mention of magnetic "variation" attributed (erroneously) to *Petrus Peregrinus,* A. D. 1269; in 1660 the line of no variation crossed the Atlantic nearly at right angles to the meridians; the author wrote the article on *Magnetism* in the Encyclopaedia Metropolitana.
—See also 2555.

2673. **Christie,** S(amuel) H(unter). (1784–1865.) Experimental determination of the laws of magneto-electric induction. (Philos. Trans. Roy. Soc., 1833, pp. 95–142.) 2 plates. 4to. *London, 1833*
The Bakerian Lecture, 1833; the object of the research was to determine

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whether the "magnetic" currents excited in different metals were, under similar circumstances, of equal strength.

2674.——On improvements in the instruments and methods employed in determining the direction and intensity of the terrestrial magnetic force. (Philos. Trans. Roy. Soc., 1833, pp. 343–358.) 4to. *London, 1833*

Means of eliminating errors in making determinations of magnetic dip.
—See also 2547.

2675. **Fisher,** George. (1794–1873.) Magnetical experiments made principally in the south part of Europe and in Asia Minor, during the years 1827–1832. (Philos. Trans. Roy. Soc., 1833, pp. 237–252.) 4to. *London, 1833*

Magnetic dip at Malta, 1829; influence of altitude on dip.

2676. **Higgins,** William M(ullinger) & J(ohn) W(illiams) **Draper.** Remarks on electrical decompositions. (Edinburgh New Philos. Journ., Vol. 14, pp. 314–316.) 8vo. *Edinburgh, 1833*

General remarks on the decomposition of substances by the passage of the electric current.
—See also 722.

2677. **Ritchie,** W(illiam). (? –1837.) Experimental researches in electro-magnetism and magneto-electricity. (Philos. Trans. Roy. Soc., 1833, pp. 313–321.) 1 plate. 4to. *London, 1833*

Experiments with revolving electromagnets.
—See also 2632.

2678. **Watkins,** Francis. On the magnetic powers of soft iron. (Philos. Trans. Roy. Soc., 1833, pp. 333–342.) 4to. *London, 1833*

Residual magnetism of soft-iron bars and horse-shoes; Arago's method of making steel-magnets.
—See also 847.

2679. **Davy,** John. (1790–1868.) Observations on the torpedo, with an account of some additional experiments on its electricity. (Philos. Trans. Roy. Soc., 1834, pp. 531–550.) 4to. *London, 1834*

Nature of the electrical discharge of the torpedo, the author was Sir Humphry Davy's brother.
—See also 2666.

2680. **Forbes,** James D(avid). (1809–1868.) Account of some experiments in which an electric spark was elicited from a natural magnet. (Trans. Roy. Soc., Edinburgh, Vol. 12, pp. 197–205.) 1 plate. 4to. *Edinburgh, 1834*

The "natural" magnet used was capable of supporting a weight of 170 lbs.
—See also 2723, 2835, 3127, 3233, 3573.

2681. **Hancock,** J. On the cause of the appearance commonly termed heat-lightning, and on certain correlative phaenomena. (Philos. Mag.) (Extract) 7 pp. 8vo. *London, 1834*

"Heat" lightning as witnessed in Demerara, British Guiana.

2682. **Harris,** (Sir) William Snow. (1792–1867.) On a new electrometer, and the heat excited in metallic bodies by voltaic electricity. (Trans. Roy. Soc., Edinburgh, Vol. 13, pp. 206–221.) 1 plate. 4to. *Edinburgh, 1834*

This is a modified form of air-thermometer.

2683.——On some elementary laws of electricity. (Philos. Trans. Roy. Soc., 1834, pp. 213–245.) 3 plates. 4to.
London, 1834
The author's "unit" jar; his views on electrical separation; effect of heat on electrical conductivity.

2683a.——Inquiries concerning the elementary laws of electricity. (Second series.) (Philos. Trans. Roy. Soc., 1836, pp. 417–452.) 2 plates. 4to. *London, 1836*
The author's bifilar balance; comparison of electrical capacities.

2683b.——(The same paper.) (Third series.) (Philos. Trans. Roy. Soc., 1836, pp. 215–242.) 2 plates. 4to. *London, 1839*
The author's "hydrostatic electrometer;" the charge of a pane-condenser varies directly as the coated area and inversely as the thickness of the glass. (Cavendish.)
—See also 2556.

2684. **Peltier,** J(ean) C(harles) A(thanase). (1785–1845.) Nouvelles expériences sur la calorité des courants électriques. (Ann. Chim. et Phys., Vol. 56, pp. 371–386.) 1 plate. 8vo.
Paris, 1834
Heat developed in conductors by the electric current.
—See also 944, 2697, 2713, 2747, 2760, 2807, 2826.

2685. **Ross,** (Sir) James Clark. (1800–1862.) On the position of the north magnetic pole. (Philos. Trans. Roy. Soc., 1834, pp. 47–52.) 4to. *London, 1834*
Observations locating the magnetic pole in *Boothia Felix*, place called after Mr. Felix Booth who furnished the means for equipping the expedition.
—See also 2710.

2686. **Traill,** (Thomas Stewart). (1781–1862.) Experiments on magnetic intensity made at Liverpool and Manchester. (Edinburgh New Philos. Journ., Vol. 17, pp. 197–198.) 8vo.
Edinburgh, 1834
The experiments show that Hansteen estimated the magnetic intensity of England a little too high.
—See also 2560.

2687. **Wheatstone,** (Sir) Charles. (1802–1875.) An account of some experiments to measure the velocity of electricity and the duration of electric light. (Philos. Trans. Roy. Soc., 1834, pp. 583–591.) 2 plates. 4to. *London, 1834*
Details of the determination made with the revolving mirror, spark-balls and resistance giving as a result for the *velocity of electricity* a value greater than that of light, *viz.* 288,000 miles per second.
—See also 2585.

2688. "$\gamma\mu$" Electro-magnetic experiments. (Edinburgh New Philos. Journ., Vol. 16, pp. 71–75.) 8vo. *Edinburgh, 1834*
Experiments on the development of magnetism in an electro-magnet by varying the arrangement of the cells in the battery.

2689. **Instructions** for observers of the aurora borealis. (Distributed by the British Association for the Advancement of Science.) (Edinburgh New Philos. Journ., Vol. 16, pp. 33–38.) 8vo.
Edinburgh, 1834

2690. **On telegraphers,** horse and foot for field service. (Reviewed in Westminster Review, Vol. 21, pp. 211–212.) 8vo. *London, 1834*

System of flag-signaling. Original work in French and in Greek.

2691. **Connell,** Arthur. (1794–1863.) On the action of voltaic electricity on alcohol, ether, and aqueous solutions. (Edinburgh New Philos. Journ., Vol. 19, pp. 159–163.) 8vo. *Edinburgh, 1835*

Remarks on Faraday's electrolytic law of definite proportions.

—See also 2721.

2692. **Davies,** Thomas Stephens. (1794 (?)–1851.) Geometrical investigations concerning the phenomena of terrestrial magnetism. (Philos. Trans. Roy. Soc., 1835, pp. 221–248.) 4to. *London, 1835*

Mathematical consequences of the theory of two magnetic poles situated arbitrarily within the earth.

2692a.——(The same paper.) Second Series: On the number of points at which a magnetic needle can take a position vertical to the earth's surface. (Philos. Trans. Roy. Soc., 1836, pp. 75–106.) 4to. *London, 1836*

The author's conclusion is that when two centres of magnetic force of equal intensity and opposite direction are situated anywhere within the earth, there are always two, and never more than two points on its surface at which the needle can take a direction perpendicular to the horizon.

2693. **Davy,** John. (1790–1868.) Remarks on certain statements of Faraday, contained in the fourth and fifth series of his "Experimental researches in electricity." (Edinburgh New Philos. Journ., Vol. 19, pp. 317–325.) 8vo. *Edinburgh, 1835*

Controversial paper in which the author defends his brother (Sir Humphry Davy) against some criticisms made by Faraday. (See No. 2705.)

—See also 2666.

2694. **Fox,** R(obert) W(ere). (1789–1877.) On the absence of magnetism in cast iron when in fusion. (Report, British Ass. Adv. Sc., 1835, Pt. II, p. 33.) 8vo. *London, 1835*

Argument tending to favor the agency of electricity in producing terrestrial magnetism; a note.

2695.——Note on the electrical relations of certain metals and metalliferous minerals. (Philos. Trans. Roy. Soc., 1835, pp. 39–40.) 4to. *London, 1835*

List of metals and minerals arranged according to their place in the electrical scale.

—See also 2647.

2696. **Moser,** Ludwig (Ferdinand). (1805–1880.) Ueber den Magnetismus der Erde. (Ann. Phys. und Chem., Vol. 34, pp. 271–292.) 8vo. *Berlin, 1835*

Terrestrial magnetism with discussion of some formulae used in magnetic determinations.

—See also 942, 2639, 2651, 2791, 2805.

2697. **Peltier,** (Jean Charles Athanase.) (1785–1845.) Expériences électro-magnétiques. (Ann. de Chim. et Phys., Vol. 60, pp. 261–271.) 8vo. *Paris, 1835*
Criticism on the two-fluid and molecular-current theories in magnetism.
—See also 2684.

2698. **Sabine,** (Sir) Edward. (1788–1883.) Report on the phenomena of terrestrial magnetism, being an abstract of the "Magnetismus der Erde" of Prof. Ch. Hansteen. (Report, British Ass. Adv. Sc., 1835, pp. 61–90.) 2 plates. 8vo. *London, 1835*
Hansteen's results discussed in the light of the author's own observations; maps of *isomagnetic* lines. (See No. 756.)
—See also 2544.

2699. **Velocity** of electricity. (Edinburgh New Philos. Journ., Vol. 19, pp. 179–181.) 8vo. *Edinburgh, 1835*
Notice of Wheatstone's experiment with the spark-discharge and rotating mirror which gave for the velocity of electrical transmission 288,000 miles per second.

2700. **Bache,** A(lexander) D(allas). (1806–1867.) On the relative horizontal intensities of terrestrial magnetism at several places in the United States, with the investigation of corrections for temperature, and comparisons of the methods of oscillations in full and in rarefied air. (Trans. Amer. Philos. Soc., N. S., Vol. 5, pp. 427–457.) 4to. *Philadelphia, 1836*
Magnetic determinations made between 1834-1836.
—See also 1436, 3334.

2701. **Barker,** William. On electric currents passing through platinum wire. (Notices of Communications to the British Ass. Adv. Sc. 1835, p. 33.) 8vo. *London, 1836*
Parts of the platinum wire observed to be dark in comparison with others that were white hot.

2702. **Christie,** Charles C. Memoranda made during the appearance of the aurora borealis on the 18th of November, 1835. (Philos. Trans. Roy. Soc., 1836, pp. 31–34.) 2 plates. 4to. *London, 1836*

2703. **Christie,** S(amuel) H(unter). (1784–1865.) Discussion of the magnetical observations made by Captain Back, during his late Arctic expedition. (Philos. Trans. Roy. Soc., 1836, pp. 377–415.) 4to. *London, 1836*
Observations on magnetic dip with some theoretical results; position of the north magnetic pole.
—See also 2547.

2704. **Daniell,** J(ohn) Frederic. (1709–1845.) On voltaic combinations in (six) letters addressed to Michael Faraday. (Philos. Trans. Roy. Soc., 1836, pp. 107–129; 1837, pp. 119–139, 1 plate; 1838, pp. 41–56, 1 plate; 1839, pp. 89–95; 1842, pp. 137–155, ill.) 4to. *London, 1836–1842*
The author's battery; defense of the chemical theory of the voltaic cell. (Two of the papers contain the author's autograph.)
—See also 828, 2752, 4989.

2705. **Faraday,** (Michael). (1791–1867.) Reply to John Davy's remarks on certain statements by Faraday, contained in his "Researches on electricity." (Edinburgh New Philos. Journ., Vol. 20, pp. 37–42.) 8vo. *Edinburgh, 1836*

Sir Humphry Davy and the law of electrolytic conduction. Reference to a regrettable controversy. (See No. 2693.)

—See also 2549.

2706. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) On a species of balance and its application to the measurement of electrical repulsion. (Report, British Ass. Adv. Sc., 1835, p. 17.) 8vo. *London, 1836*

The needle of the instrument is suspended by two parallel torsionless threads; a note.

2707.— —On electrical attraction. (Report, British Ass. Adv. Sc., 1835, pp. 17–18.) 8vo. *London, 1836*

Remarks on the law of the inverse square of the distance; cases in which it does not hold; a note.

2708.— —On the investigation of magnetic intensity by the oscillations of the horizontal needle. (Trans. Roy. Soc., Edinburgh, Vol. 13, pp. 1–26.) 3 plates. 4to. *Edinburgh, 1836*

The mechanical conditions of the magnet, mode of suspension, temperature, disturbing influence of the air, studied experimentally; practical deductions.

—See also 2556.

2709. **Johnson,** Edward J(ohn). (? –1853.) Report of magnetic experiments tried on board an iron steam-vessel. (Philos. Trans. Roy. Soc., 1836, pp. 267–288.) 1 plate. 4to. *London, 1836*

Practical observations on placing compasses on board steam-vessels generally.

—See also 1116.

2710. **Lloyd,** Humphrey (1800–1881), (Sir) Edward **Sabine** (1788–1883) & (Sir) J(ames) C(lark) **Ross** (1800–1862). Observations on the direction and intensity of the terrestrial magnetic force in Ireland. (Report, British Adv. Sc., 1835, pp. 117–162.) 1 map. 8vo. *London, 1836*

—See also 1023, 2544, 2685, 2726.

2711. **M'Gauley,** James William. (? –1867.) An inquiry into the possibility and advantage of the application of magnetism as a moving power, with remarks on the nature of magnetism. (Notices, British Ass. Adv. Sc., 1835, pp. 20–24.) 8vo. *London, 1836*

2712. **Mallet,** Robert. (1810–1881.) On an economic application of electro-magnetic forces to manufacturing purposes. (Notices, British Ass. Adv. Sc., 1835, pp. 18–19.) 8vo. *London, 1836*

Magnetic separation of iron from copper filings.

—See also 2837.

2713. **Peltier,** J(ean) C(harles) A(thanase). (1785–1845.) Observations sur quelques causes d'erreur dans les mésures des tensions électriques et description d'un nouvel électromètre. (Ann. Chim. et Phys., Vol. 62, pp. 422–432.) 1 plate. 8vo. *Paris, 1836*

Remarks on Henley's "electrometer" and Coulomb's torsion balance.

—See also 2684.

2714. **Ross,** (Sir) John. (1777–1856.) On the aurora borealis. (Notices, British Ass. Adv. Sc., 1835, p. 18.) 8vo. *London, 1836*
The aurora borealis is said to take place within the cloudy regions of the earth's atmosphere.
—See also 897.

2715. **Sabine,** (Sir) Edward. (1788–1883.) Observations on the direction and intensity of the terrestrial magnetic force in Scotland. (Report, British Ass. Adv. Sc., Vol. 6, pp. 97–119.) 1 plate. 8vo. *London, 1836*
This magnetic survey of Scotland was made in 1836.
—See also 2544.

2716. **Wheatstone,** (Sir) (Charles). (1802–1875.) On the prismatic decomposition of electrical light. (Notices, British Ass. Adv. Sc., 1835, pp. 11–12.) 8vo. *London, 1836*
Spark-spectrum obtained by using mercury, zinc, cadmium and bismuth electrodes; Fraunhofer lines.

2717.— —On the various attempts which have been made to imitate human speech by mechanical means. (Notices, British Ass. Adv. Sc., 1835, p. 14.) 8vo. *London, 1836*
Note on Hempler's talking-machine.
—See also 2585.

2718. **Report** of the Astronomer Royal of the Royal Observatory at Greenwich to the Board of Visitors for 1836, 1852, 1855–1892. 2 vols. Sq. folio. *Greenwich, 1836–1892*
The magnetic constants annually determined at Greenwich.

2719. **Bird,** Golding. (1814–1854.) Observations on the electrochemical influence of long-continued electric currents of low tension. (Philos. Trans. Roy. Soc., 1837, pp. 37–45.) 1 plate. 4to. *London, 1837*
Slight modification of Prof. Daniell's newly invented battery in order to adapt it to electrochemical work.
—See also 1140.

2720. **Christie,** S(amuel) Hunter (1784–1865) & (Sir) G(eorge) B(iddell) **Airy.** (1801–1892.) Report upon a letter addressed by M. le baron de Humboldt to His Royal Highness the President of the Royal Society. (Edinburgh New Philos. Journ., Vol. 22, pp. 316–330.) 8vo. *Edinburgh, 1837*
Report on terrestrial magnetism.
—See also 2547, 2750.

2721. **Connell,** Arthur. (1794–1863.) On the action of voltaic electricity on pyroxylic spirit, and solutions in water, alcohol, and ether. (Philos. Trans. Roy. Soc., Vol. 14, Pt. I, pp. 110-136.) 4to. *London, 1837*
Electrolytic decomposition of alcohol and chemical nature of the changes produced; secondary actions.

2721a.— —Farther researches on the voltaic decomposition of aqueous and alcoholic solutions. (Philos. Trans. Roy. Soc., Vol. 15, Pt. I, pp. 151–163.) 4to. *London, 1841*
Law limiting the direct action of the current to the solvent.
—See also 2691.

2722. **Dalton,** John. (1766–1844.) Sequel to an essay on the constitution of the atmosphere, published in the Philosophical Transactions for 1826; with some account of the sulphurets of lime. (Philos. Trans. Roy. Soc., 1837, pp. 347–363.) 4to. *London, 1837*

Quantity of oxygen in air taken at different altitudes.
—See also 2626.

2723. **Forbes,** James D(avid). (1809–1868.) Account of some experiments made in different parts of Europe on terrestrial magnetic intensity. (Trans. Roy. Soc., Edinburgh, Vol. 14, pp. 1–29.) 1 map. 4to. *Edinburgh, 1837*

General account of the variations of the earth's magnetic intensity together with determinations of the same made with Hansteen's apparatus in different parts of Europe.

2723a.——Account of some additional experiments on terrestrial magnetism. (Trans. Roy. Soc., Edinburgh, Vol. 15, pp. 27–36.) 4to. *Edinburgh, 1840*

Observations of dip and total force in some towns in Germany and also in the Swiss Alps.
—See also 2680.

2724. **Henry,** Joseph. (1797–1878.) Contributions to electricity and magnetism. I. Description of a galvanic battery for producing electricity of different intensities. (Trans. Amer. Philos. Soc., N. S., Vol. 5, pp. 217–222.) 4to. *Philadelphia, 1837*

Some of Henry's induction experiments with flat coils.

2725.——(The same paper.) II. On the influence of a spiral conductor in increasing the intensity of electricity from a galvanic arrangement of a single pair. (Trans. Amer. Philos. Soc., N. S., Vol. 5, pp. 223–231.) 4to. *Philadelphia, 1837*

2725a.——(The same paper.) (Philos. Mag., Ser. III, Vol. 16, pp. 257–265.) ill. 8vo. *London, 1840*
—See also 2667.

2726. **Lloyd,** H(umphrey). (1800–1881.) An attempt to facilitate observations of terrestrial magnetism. (Trans. Irish Academy, Vol. 17, pp. 159–170.) 4to. *Dublin, 1837*

The author shows how the dip and force may be measured directly by a single instrument. (Autograph copy).

2726a.——Further development of a method of observing the dip and the magnetic intensity at the same time. (Trans. Irish Academy, Vol. 17, pp. 449–460.) 4to. *Dublin, 1837*

Results obtained by the author's method for the direction and intensity of magnetic force in Dublin during the year 1834.
—See also 2710, 2769, 2790, 2823, 2883, 3004, 3099, 3238, 3458.

2727. **McConnell,** Benjamin Rush. Notice of a revolving electro-magnetic instrument. (Amer. Journ. Sc. and Arts, Vol. 33, pp. 188–190.) 8vo. *New Haven, 1837*

This electro-magnetic engine has points in common with the one devised by Sturgeon in 1828.

2728. Matteucci, Carlo. (1811–1868.) Sur la propagation du courant électrique dans les liquides. (Ann. Chim. et Phys., Ser. II, Vol. 66, pp. 225–313.) 8vo. *Paris, 1837*

Remarks on the nature of electrification and the electric current.

—See also 985, 2770, 2779, 2839, 2851, 2867, 2903, 2919, 2939, 3067, 3193, 3244, 3304, 3461.

2729. Page, Charles Grafton. (1812–1868.) Method of increasing shocks, and experiments with Prof. Henry's apparatus for obtaining sparks and shocks from the calorimotor. (Amer. Journ. Sc. & Arts, Vol. 31, pp. 137–141.) 8vo.

New Haven, 1837

2730.——On the use of the dynamic multiplier, with a new accompanying apparatus. (Amer. Journ. Sc. & Arts, Vol. 32, pp. 354–360.) 8vo. *New Haven, 1837*

—See also 1651, 2742, 2758, 5112.

2731. Pollock, Thomas. The action of the voltaic battery shown to be two-fold, and the distinction between the terms quantity and intensity determined by the theory of vibration. (Trans. London Electr. Soc., 1837, pp. 1–9.) 1 plate. 4to.

London, 1837

The writer seeks to show that the true cause of the electric and the chemical action of the current is the difference of the "electromotive power" of solid bodies for the same fluid.

—See also 870.

2732. Schoenbein, C(hristian) F(riedrich). (1799–1868.) Experimental researches on a peculiar action of iron upon solutions of some metallic salts. (Philos. Mag., Vol. 10, pp. 267–274.) 8vo.

London, 1837

It is held that the electric current is due to chemical action and not to the mere contact of dissimilar metals.

—See also 989, 2749, 2794, 2943.

2733. Simonoff, (Ivan Michailowitch). (1785–1855.) Sur le magnétisme terreste. (Journ. Mathémat., Crelle, Vol. 16, pp. 197–205.) 4to. *Berlin, 1837*

Biot's theory in terrestrial magnetism of a short, central magnet discussed.

2734. Traill, William. St. Elmo's fire seen in Orkney. (Edinburgh New Philos. Journ., Vol. 23, p. 220.) 8vo. *Edinburgh, 1837*

Note descriptive of the phenomenon which was vivid but of short duration.

2735. Davenport's electro-magnetic machine. (Amer. Journ. Sc. & Arts, Vol. 33, p. 193.) 8vo. *New Haven, 1837*

Brief notice of the apparatus without diagram.

2736. Morse's electro-magnetic telegraph. (Amer. Journ. Sc. & Arts, Vol. 33, pp. 185–187.) 8vo. *New Haven, 1837*

The distinguishing features of the system; specimen of the Morse code.

2737. The Penny cyclopedia of the Society for the diffusion of useful knowledge. Vol. 9 (Dio—Erne). L. 8vo. *London, 1837*

Articles on *electricity, electrometer* and *electro-dynamics.*

2738. **Andrews**, Thomas. (1813–1885.) On the properties of voltaic circles in which concentrated sulphuric acid is the liquid conductor. (Trans. Irish Academy, Vol. 18, pp. 149–156.) 4to. *Dublin, 1838*

Experiments bearing on the zinc in voltaic batteries.
—See also 3163.

2739. **Becquerel**, (Antoine César). (1788–1878.) Observations on the electric origin of metalliferous veins. (Edinburgh New Philos. Journ., Vol. 25, pp. 167–173.) 8vo. *Edinburgh, 1838*

"It appears almost certain that veins have not all been produced by one general cause, and that many influences have sometimes concurred in their formation."
—See also 2564.

2740. **Fox**, R(obert) W(ere). (1789–1877.) On the lamination of clay by electricity. (Edinburgh New Philos. Journ., Vol. 25, pp. 196–198.) 8vo. *Edinburgh, 1838*

The author shows how this laminated state may be imitated electrically.
—See also 2647.

2741. **Héricart de (Thury)**, (Louis Etienne François). (1776–1854.) De l'influence des arbres sur la foudre et ses effets et considérations à ce sujet. (Extrait, Ann. de l'Agricult. Franç., 1838.) 27 pp. 8vo. *Paris, 1838*

Protective power of trees recognized; description of trees struck by lightning.

2742. **Page**, Charles G(rafton). (1812–1868.) Electro-magnetic apparatus and experiments. (Amer. Journ. Sc. & Arts, Vol. 33, pp. 190–192.) ill. 8vo. *New Haven, 1838*

Rotation of conductors conveying currents, without the use of mercury.

2743.——Experiments in electro-magnetism. (Amer. Journ. Sc. & Arts, Vol. 33, pp. 118–120.) 8vo. *New Haven, 1838*

Galvanic music; electromagnetism as a moving power.

2744.——New magnetic electrical machine of great power with two parallel horse-shoe magnets, and two straight rotating armatures, affording each, in an entire revolution, a constant current in the same direction. (Amer. Jour. Sc. & Arts, Vol. 34, pp. 163–169.) 8vo. *New Haven, 1838*

2745.——Rotatory multiplier, or astatic galvanometer. (Amer. Journ. Sc. & Arts, Vol. 33, pp. 376–379.) 8vo. *New Haven, 1838*

2746.——Researches in magnetic electricity and new magnetic electrical instruments. (Amer. Journ. Sc. & Arts, Vol. 34, pp. 364–373.) 8vo. *New Haven, 1838*
—See also 2729.

2747. **Peltier**, J(ean) C(harles) A(thanase). (1785–1845.) Une note sur la force électro-motrice du contact, en opposition à la manière de voir émise recemment sur cette question par M. Fechner et par M. Péclet dans la troisième édition de son Traité de physique. ("L'Institut" No. 258, 1838, 4 pp.) 8vo. *Paris, 1838*

Statement and defense of the author's views on contact electricity.
—See also 2684.

2748. **Poisson,** (Siméon Denis). (1781–1840.) Mémoire sur les déviations de la boussole, produites par le fer des vaisseaux. (Mém. Acad. Sc., Paris, Vol. 16, pp. 479–555.) 4to. *Paris, 1838*
Noteworthy paper of the French mathematician on magnetic theory.
—See also 2610.

2749. **Schoenbein,** C(hristian) F(riedrich). (1799–1868.) Beobachtungen ueber das elektro-motorische Verhalten einiger Metallhyperoxyde, des Platins und des passiven Eisens. (Ann. Phys. und Chem., Vol. 43, pp. 89–104.) 8vo. *Berlin, 1838*
Note on the *passive state* of iron.
—See also 2732.

2750. **Airy,** (Sir) G(eorge) B(iddell). (1801–1892.) Account of experiments on iron-built ships, instituted for the purpose of discovering a correction for the deviation of the compass produced by the iron of the ships. (Philos. Trans. Roy. Soc., 1839, pp. 167–213.) 4to. *London, 1839*
The experiments show the great intensity of permanent magnetism of malleable iron; every plate of rolled iron was found to be strongly magnetic.
—See also 1376, 2720, 2993, 3017, 3047, 3077, 3277, 3332, 3381, 3574, 3595, 3626, 3678, 3713, 4255.

2751. **Arago,** (Dominique François Jean). (1786–1853.) On thunder and lightning. (Edinburgh New Philos. Journ., Vol. 26, pp. 81–144+275–291.) 8vo. *Edinburgh, 1839*
This is one of Arago's famous memoirs; the various kinds of lightning; thunder-tubes; danger to powder-magazines; protection of life and property; the ringing of bells and firing of guns during a storm.
—See also 2671.

2752. **Daniell,** J(ohn) Frederic. (1790–1845.) On the electrolysis of secondary compounds in (two) letters addressed to Michael Faraday. (Philos. Trans. Roy. Soc., 1839, pp. 97–112, ill.; 1840, pp. 209–224, 2 plates.) 4to. *London, 1839-1840*
Electrical decomposition of sodium sulphate, sulphate of ammonia and binary compounds.

2752a.——Additional researches. (Philos. Trans. Roy. Soc., 1844, pp. 1–20.) 4to. *London, 1844*
—See also 2704.

2753. **Farquharson,** James. (1781–1843.) Report of a geometrical measurement of the height of the Aurora Borealis above the earth. (Philos. Trans. Roy. Soc., 1839, pp. 267–280.) 4to. *London, 1839*
The calculation gives a little less than one mile as the greatest height of a particular aurora borealis.
—See also 2636.

2754. **Hare,** R(obert). (1781–1858.) Engraving and description of a rotatory multiplier, or one in which one or more needles are made to revolve by a galvanic current. (Trans. Amer. Philos. Soc., N. S., Vol. 6, pp. 343–345.) 4to. *Philadelphia, 1839*
Electro-magnetic motor: continuous rotation obtained by a timely interruption of the current in the surrounding coil.
—See also 2766, 2778.

2755. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) Brief history of two hundred and twenty ships of the Royal Navy of Great Britain, struck and damaged by lightning. (pp. 39–61.) 8vo. *London, (1839?)*

The conclusion is: "Equip the ships with lightning conductors".
—See also 2556.

2756. **Henry,** Joseph. (1797–1878.) Contributions to electricity and magnetism. III. On electro-dynamic induction. (Trans. Amer. Philos. Soc., N. S., Vol. 6, pp. 303–337.) 4to. *Philadelphia, 1839*

Induced currents of different orders; induction effects due to Leyden jar discharge.
—See also 2667.

2757. **Martens,** (Martin). (1797–1863.) Mémoire sur la pile galvanique et sur la manière dont elle opère les décompositions des corps. (Mém. Acad. Sc., Belgique, Vol. 12, pp. 1–47.) 4to. *Brussels, 1839*

Theory of the voltaic cell and of electrolytic decomposition.
—See also 2838.

2758. **Page,** Charles Grafton. (1812–1868.) Magneto-electric and electro-magnetic apparatus and experiments. (Amer. Journ. Sc. & Arts, Vol. 35, pp. 252–268.) 8vo. *New Haven, 1839*

2759.— ——On electro-magnetism as a moving power. (Amer. Journ. Sc. & Arts, Vol. 35, pp. 106–113.) 8vo. *New Haven, 1839*
—See also 2729.

2760. **Peltier,** (Jean Charles Athanase). (1785–1845.) Mémoire sur la formation des tables des rapports qu'il y a entre la force d'un courant électrique et la déviation des aiguilles des multiplicateurs. (Ann. Chim. et Phys., Ser. II, Vol. 71, pp. 225–313.) 8vo. *Paris, 1839*

Electricity of contact and its measurement; remarks on laws of thermo-electric currents.
—See also 2684.

2761. **Quetelet,** (Lambert) A(dolphe Jacques). (1796–1874.) Sur l'état du magnétisme terrestre à Bruxelles, pendant les douze années de 1827 à 1839. 40 pp. 4to. *Brussels, 1839*

Magnetic dip and declination at Brussels for the period 1827-1839 followed by discussion of observations.
—See also 2649.

2762. **Faraday,** Michael. (1791–1867.) Experimental researches in electricity. Sixteenth and Seventeenth Series. 24. On the source of power in the voltaic pile. (Philos. Trans. Roy. Soc., 1840, pp. 61–127.) 1 plate. 4to. *London, 1840*

Contact electromotive force.
—See also 2549.

2763. **Fox,** Robert Were. (1789–1877.) Some remarks on electric currents in metalliferous veins. (Edinburgh New Philos. Journ., Vol. 28, pp. 267–270.) 8vo. *Edinburgh, 1840*

Experiments made by the author in mines which indicate a general tendency in the electric currents to take a westerly direction in veins in-

clining towards the north, but an easterly one in veins dipping towards the south.
—See also 2647.

2764. **Gibbs,** Oliver W(olcott). A description of a new form of magneto-electric machine, and an account of a carbon battery of considerable energy. (Amer. Journ. Sc. & Arts, Vol. 39, pp. 132–134.) 8vo. *New Haven, 1840*

Brass disc centered on bar of iron which is wound on one end with 400 feet of wire and at the other end with four times that quantity of finer wire. One extremity of the coarse wire goes to the battery, the other extremity connects with the other electrode through a make-and-break contact. Currents are induced in the fine-wire coil.

2765. **Haldat du Lys,** (Charles Nicolas Alexandre). (1770–1852.) Recherches sur les causes de l'extinction du son. (Mém. Soc. Sc., Nancy, 1840, pp. 88–101.) 8vo. *Nancy, 1840*

The paper takes into consideration the influence of solid, liquid and gaseous bodies in extinguishing sound.
—See also 979.

2766. **Hare,** Robert. (1781–1858.) A letter to Prof. Faraday, on certain theoretical opinions. (Amer. Journ. Sc. & Arts, Vol. 38, pp. 1–11.) 8vo. *New Haven, 1840*

Considerations on the nature of positive and negative electricity. Dr. Hare was Professor of Chemistry in the University of Pennsylvania; he devised the apparatus known as Hare's *Deflagrator.*
—See also 2754.

2767. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) On lightning conductors, and the effects of lightning on Her Majesty's Ship *Rodney* and certain other ships of the British Navy: being a further examination of Sturgeon's memoir on marine lightning conductors. (Philos. Mag., Ser. III, Vol. 16, pp. 117–128.) 1 plate. 8vo. *London, 1840*

General character and effect of the electric discharge.
—See also 2556.

2768. **Hunt,** Robert. (1807–1887.) Experiments and observations on light which has permeated coloured media, and on the chemical action of the solar spectrum. (Philos. Mag., Ser. III, Vol. 16, pp. 267–275.) 8vo. *London, 1840*
—See also 1099.

2769. **Lloyd,** Humphrey. (1800–1881.) On the mutual action of permanent magnets. (Trans. Roy. Irish Academy, Vol. 19, pp. 159–176+249–256.) 2 plates. 4to. *Dublin, 1840–1841*

Special reference is made to the position of magnets in magnetic observatories: a mathematical paper.
—See also 2726.

2770. **Matteucci,** Carlo. (1811–1868.) Sur l'action chimique du courant voltaique. (V. mémoire.) (Bibliothèque Univers., Genève, Vol. 26, pp. 380–390.) 8vo. *Geneva, 1840*
—See also 2728.

2771. **Reich,** F(erdinand). (1799–1882.) Researches on the electrical currents in metalliferous veins, made in the mine "Himmelfahrt" near Freyberg. (Edinburgh New Philos. Journ., Vol. 28, pp. 1–15.) 8vo. *Edinburgh, 1840*
The laws which these currents seem to follow are deduced from numerous experimental observations.

2772. **Sabine,** (Sir) Edward. (1788–1883.) Contributions to terrestrial magnetism No. I. Lines of inclination and intensity in the Atlantic Ocean II. Lines of intensity between the Cape of Good Hope and Australia. (Philos. Trans. Roy. Soc., 1840, pp. 129–155.) 2 plates. 4to. *London, 1840*
Observations of magnetic intensity and dip made by Lieut. Sulivan in a voyage across the Atlantic 1838-1839.
—See also 2544.

2773. **Description** d'un nécessaire électrodynamique ou d'un appareil construit par MM. Breton frères et à l'aide du quel on peut répéter facilement les expériences fondamentales de Volta, d'Oersted, d'Ampère, de Nobili, de Faraday, de Ritchie, etc. relatives aux propriétés physiques, chimiques et dynamiques des courants électriques. 14 pp. 4to. *Paris, (1840?)*
Brief description with diagrams of such electro-dynamical apparatus as Ampère's stand, Barlow's wheel, solenoids etc.

2774. **Abria,** (Jérémie Joseph Benôit). (1811–1892.) Recherches sur l'aimantation par les courants. (Ann. Chim. et Phys., Ser. III, Vol. I, pp. 385–439.) 8vo. *Paris, 1841*
—See also 1245, 3275.

2775. **Bravais,** A(uguste) (1811–1863) & C(harles Frédéric) **Martins** (1806–1889). Comparaisons barométriques faites à Bruxelles et dans le nord de l'Europe. (Mém. Acad. Sc., Bruxelles, Vol. 14, pp. 31–78.) 4to. *Brussels, 1841*
Short description of the barometers of various well-known observatories.
—See also 1245, 3275.

2776. **Duperrey,** (Louis Isidore). (1786–1865.) Extrait d'une lettre, au sujet des observations sur les intensités relatives du magnétisme terrestre à Paris et à Bruxelles. (Bull. Acad. Sc., Bruxelles, Vol. 8, No. 7, pp. 1–6.) 8vo. *Brussels, 1841*

2777. **Goldschmidt,** (C. W.) B. Results of the daily observations of magnetic declination during six years at Goettingen. (Translation.) (Taylor's Scientific Memoirs, Ser. I, Vol. 2, pp. 589–600.) 8vo. *London, 1841*
Discussion of the daily magnetic observations made during the years 1834-1840.

2778. **Hare,** Robert. (1781–1858.) On the extrication of the alkalifiable metals, barium, strontium, and calcium. (Amer. Philos. Soc., N. S., Vol. 7, pp. 31–41.) 4to. *Philadelphia, 1841*
An electrolytic process is described.
—See also 2754.

2779. **Matteucci,** Carlo. (1811–1868.) Deuxième mémoire sur le courant électrique propre de la grenouille et sur celui des animaux à sang chaud. (Ann. Chim. et Phys., Ser. III, Vol. 6, pp. 301–339.) 8vo. *Paris, 1841*

—See also 2728.

2781. **(Palmer,** W.) Electrotype; a brief description of the art of working in metal by voltaic electricity. 20 pp. 12mo. *London, 1841*

2782. **Poggendorff,** J(ohann) C(hristian). (1796–1877.) Methode zur quantitativen Bestimmung der elektromotorischen Kraft inconstanter galvanischer Ketten. (Ann. Phys. und Chem., Vol. 54, pp. 161–191.) 8vo. *Leipzig, 1841*

This is the author's *compensation method* of comparing the electromotive force of cells.

2782a.——(The same paper.) (Verh. Akad. Wiss., Berlin, 1841, pp. 263–294.) 8vo. *Berlin, 1841*

2783.——Ueber die Frage, ob es wirksame galvanische Ketten ohne primitive chemische Action gebe, und ueber die Bildung der Eisensaeure auf galvanischem Wege. (Ann. Phys. und Chem., Vol. 54. pp. 353–377.) 8vo. *Leipzig, 1841*

The e. m. f. of a platinum-iron couple; also chemical theory of the voltaic cell.

2783a.——(The same paper.) (Verh. Akad. Wiss., Berlin, 1841, pp. 312–324.) 8vo. *Berlin, 1841*

—See also 1027, 2792, 2842, 3410, 3610.

2784. **Sabine,** (Sir) Edward. (1788–1883.) Contributions to terrestrial magnetism. No. III. Captain Belcher's observations on the west coast of America and the adjacent islands. IV. New determination of the magnetic elements at Otaheite. (Philos. Trans. Roy. Soc., 1841, pp. 11–35.) 4to. *London, 1841*

Magnetic observations made by Captain Belcher on the West Coast of America, 1837-1840; the magnetic elements at Otaheite, April 1840.

—See also 2544.

2785. **Weber,** Wilhelm (Eduard). (1804–1891.) An extract from Remarks on the term-observations for 1839, of the German Magnetic Association. (Taylor's Scientific Memoirs, Vol. II, pp. 587–588.) 1 plate. 8vo. *London, 1841*

Remarks on magnetic observations made in high latitudes in 1838 and 1839.

2786.——On a transportable magnetometer. (Taylor's Scientific Memoirs, Vol. II, pp. 565–600.) 2 plates. 8vo. *London, 1841*

General remarks on magnetometers; determination of the horizontal component of the earth's magnetic force.

—See also 1110, 3270.

2787. **List** of ships fited with Harris's lightning conductors since 1839. 1 p. Folio. *1841*

2788. **Sabine,** (Sir) Edward. (1788–1883.) Contributions to terrestrial magnetism. No. V. Observations between England and the Cape of Good Hope. VI. Observations between the Cape

of Good Hope and Kerguelen Island. (Philos. Trans. Roy. Soc., 1842, pp. 9–41.) 1 plate. 4to. *London, 1842*

Observations of magnetic intensity made by the officers of Her Majesty's ships *Erebus* and *Terror*, 1839-1840.

—See also 2544.

2789. **Harris,** (Sir) W(illiam) S(now). (1792–1867.) On the specific inductive capacities of certain electrical substances. (Philos. Trans. Roy. Soc., 1842, pp. 165–172.) 1 plate. 4to. *London, 1842*

Table of the dielectric constant of glass, pitch, sulphur, and wax, air being taken as unity.

—See also 2556.

2790. **Lloyd,** Humphrey. (1800–1881.) Account of the magnetical observatory of Dublin, and of the instruments and methods of observation employed there. 54 pp. 5 plates. 4to. *Dublin, 1842*

Construction and adjustment of the instruments of a magnetic observatory.

—See also 2726.

2791. **Moser,** Ludwig (Ferdinand). (1805–1880.) On the power which light possesses of becoming latent. (Taylor's Scientific Memoirs, Vol. III, pp. 465–489.) 8vo. *London, 1842*

Remarks on the work of *Daguerre*.

—See also 2696.

2792. **Poggendorff,** (Johann Christian). (1796–1877.) Ueber eine Methode, die relativen Maxima der Stromstaerken zweier Volta'schen Ketten zu bestimmen. (Verh. Akad. Wiss., Berlin, 1842, pp. 6–19.) 8vo. *Berlin, 1842*

Note on a method of comparing the current strength of two batteries.

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An improved voltameter.

—See also 2782.

2794. **Schoenbein,** C(hristian) F(riedrich). (1799–1868.) Observations sur quelques actions électrolysantes de la pile simple. Observations sur un état particulier du fer. Notice sur une nouvelle pile voltaique. (Arch. Electr. (Suppl. à Bibl. Univers.) Vol. 2, pp. 241–285.) 8vo. *Geneva, 1842*

Influence of the nature of the electrodes on decompositions effected by the electric current.

—See also 2732.

2795. **Snow,** Robert. (1806–1854.) Observations of the aurora borealis, from September 1834 to September 1839. 17 pp. ill. 12mo. *London, 1842*

Brief account of 25 aurorae with general meteorological remarks.

2796. **Uylenbroek,** P(ieter) J(ohannes). (1797–1844.) Verlag van eenige proeven, genomen met eene batterij van verkwikt zink ijzer en verund zwavelzuur. 6 pp. 8vo. *Leyden, 1842*

Some effects of the electric current.

2797. **Watson,** (Barnard L.) The handbook of communication by telegraph; describing the various methods either by flags or other semaphores and the machines in use at the admiralty. Second edition. 66 pp. ill. 12mo. *London, 1842*

Beacons, semaphores and mechanical telegraphs.

2798. **Adie,** R(ichard). (1810–1880.) An account of experiments with thermo and hydro-electrical currents, with an examination of the metals exposed to thermo-electric action. (Edinburgh New Philos. Journ., Vol. 35, pp. 345–353, Vol. 36, pp. 90–102.) 8vo. *Edinburgh, 1843–1844*

Numerous experiments with thermo-electric batteries made for the purpose of testing the view that heat may be regarded as a compound of latent heat and electricity.

—See also 2817, 2857.

2799. **Aimé,** (George). (1813?–1846.) Mémoire sur le magnétisme terrestre. (Comptes Rendus, Acad. Sc., Paris, Vol. 17, pp. 1031–1040.) 4to. *Paris, 1843*

Magnetic observations made in Algiers in 1841.

2800. **(Dempster,** Henry?). The "Problem," its origin and development, with a brief sketch of the life of the inventor during a thirteen years' residence in India and China. 83 pp. ill. 8vo. *Glasgow, 1843*

The *Problem* is the name of a yacht built for speed, stability and weatherly qualities.

—See also 5516.

2801. **Faraday,** Michael. (1791–1867.) Experimental researches in electricity. Eighteenth Series. 25. On the electricity evolved by the friction of water and steam against other bodies. (Philos. Trans. Roy. Soc., 1843, pp. 17–32.) 1 plate. 4to. *London, 1843*

—See also 2549.

2802. **Grove,** (Sir) W(illiam) R(obert). (1811–1896.) On the gas voltaic battery, experiments made with a view of ascertaining the rationale of its action and its application to eudiometry. (Philos. Trans. Roy. Soc., 1843, pp. 91–112.) 1 plate. 4to. *London, 1843*

Various forms of the author's *gas battery;* effects produced; experiments bearing on the theory of its action.

2802a.— —On the gas voltaic battery, voltaic action of phosphorous, sulphur and hydrocarbons. (Philos. Trans. Roy. Soc., 1845, pp. 351–361.) 1 plate. 4to. *London, 1845*

List of gases which may be used as excitants in Grove's *gas battery.*

—See also 1017, 2861, 2900, 2963, 3000, 3024, 3093, 3131 bis., 3183.

2803. **Lamont,** J(ohann) von. (1805–1879.) An account of the magnetic observatory and instruments at Munich: extracted from a Memoir entitled "Ueber das Magnetische Observatorium der Kgl. Sternwarte bei Muenchen." (Taylor's Scientific Memoirs, Vol. 3, pp. 499–526.) 2 plates. 8vo. *London, 1843*

General remarks on terrestrial magnetism; description of instruments.

—See also 1049, 2984, 3299.

2804. **Letheby,** Henry. (1817–1876.) An account of the dissection of a gymnotus electricus; together with reasons for believing that it derives its electricity from the brain and spinal cord and that the nervous and electrical forces are identical. (Proc. London Electr. Soc., 1843, pp. 367–385.) 3 plates. L. 8vo.
London, 1843

Anatomy and properties of the electrical organs of the *gymnotus.*

2804a.——An account of the dissection of the second gymnotus electricus; together with a description of the electrical phenomena and anatomy of the torpedo. (Proc. London Electr. Soc., 1843, pp. 512–527.) 5 plates. L. 8vo. *London, 1843*

2805. **Moser,** Ludwig (Ferdinand). (1805–1880.) On vision and the action of light on all bodies. (Taylor's Scientific Memoirs, Vol. 3, pp. 422–461.) 8vo. *London, 1843*

An inquiry into the action of light on the retina.

2806.——Some remarks on invisible light. (Taylor's Scientific Memoirs, Vol. 2, pp. 461–464.) 8vo. *London, 1843*

Pictures obtained from gold, copper, lead and other metals when exposed to certain vapors.

—See also 2696.

2807. **Peltier,** (Jean Charles) A(thanase). (1785–1845.) An inquiry into the cause of the electric phaenomena of the atmosphere, and on the means of collecting their manifestations. (Taylor's Scientific Memoirs, Vol. 3, pp. 377–421.) 8vo. *London, 1843*

Discussion of experiments and observations on positively and negatively charged atmospheric vapors.

—See also 2684.

2808. **Sabine,** (Sir) Edward. (1788–1883.) Contributions to terrestrial magnetism. No. 7. Second series of magnetic determinations. (Philos. Trans. Roy. Soc., 1843, pp. 113–143.) 4to.
London, 1843

Determinations by Sir Edward Belcher of the three magnetic elements at 32 stations in Chinese waters and the Pacific Ocean.

2809.——(The same paper.) No. 8. Observations within the Antarctic Circle, made on board H. M. S. *Erebus* and *Terror,* in the summer of 1840, 1841, in the expedition under the Command of Captain Sir James Clark Ross, R. N. No. 9. Observations between Kerguelen Island and Van Diemen's Island, made on board H. M. S. *Erebus,* July and August, 1840. (Philos. Trans. Roy. Soc., 1843, pp. 145–231.) 3 plates. 4to.
London, 1843

—See also 2544.

2810. **Silliman,** B(enjamin, jr.) (1816–1885.) Description of a carbon voltaic battery. (Amer. Journ. Sc. & Arts, Vol. 44, pp. 180–186.) ill. 8vo. *London, 1843*

This is a modification of Grove's battery.

2811. **Walker,** Charles V(incent). (1811–1882.) Memoir on the difference between Leyden discharges and lightning flashes and on their relative action upon metallic bodies vicinal to the

conductor of the respective discharges. (Proc. London Electr. Soc., 1843, Vol. I, pp. 465–504.) ill. L. 8vo. *London, 1843*
Much interesting matter on the nature of the Leyden jar discharge which the author believes to be essentially different from a flash of lightning. (Autograph copy).
—See also 1007, 3156, 3269, 3328, 3474, 3850, 4050, 4382, 4706, 5185, 5411.

2812. **Wheatstone,** (Sir) Charles. (1802–1875.) An account of several new instruments and processes for determining the constants of a voltaic circuit. (Philos. Trans. Roy. Soc., 1843, pp. 303–327.) 1 plate. 4to. *London, 1843*
Credit is given to Mr. S. Hunter Christie of the Military Academy, Woolwich, for a method of comparing resistances which has since been known as the *Wheatstone bridge method.*
—See also 2585.

2813. **Wishaw,** F. Cooke's improved arrangements of the conducting electric telegraph. (Journ. Soc. of Arts, Vol. 54, pp. 172–174.) 8vo. *London, 1843*
Remark on Wheatstone's value for the "velocity" of electricity.

2814.— —On the application of electricity to the transmission of telegraphic signals. (Journ. Soc. of Arts, Vol. 54, pp. 170–172.) 8vo. *London, 1843*
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2815a.— —(The same paper.) 20 pp. 8vo. *London, 1843*

2816. **Recent** applications of electricity to the arts. (Companion to the Almanac for 1843, pp. 1–20.) 12mo. *London, 1843*
Short articles on Snow Harris' lightning conductors, copper sheathing etc.

2817. **Adie,** R(ichard). (1810–1880.) An account of electrical experiments. (Edinburgh New Philos. Journ., Vol. 37, pp. 298–304; Vol. 38, pp. 97–101.) 8vo. *Edinburgh, 1844–1845*
The Peltier *effect;* experiments with his *cross.*
—See also 2798.

2818. **Barry,** Emile (Louis François). (1799– ? .) Statique appliquée au magnétisme; note sur la manière de corriger le défaut de centrage des boussoles d'inclination. (Nouvelles Ann. Math., Vol. 3, pp. 257–264.) 1 plate. 8vo. *Paris, 1844*
Errors due to incorrect centering of dip circles.

2819. **Gassiot,** John P(eter). (1797–1877.) A description of an extensive series of the water battery; with an account of some experiments made in order to test the relation of the electrical and the chemical actions which take place before and after completion of the voltaic circuit. (Philos. Trans. Roy. Soc., 1844, pp. 39–52.) 1 plate. 4to. *London, 1844*
Gassiot's water-battery consisted of 3520 small copper-zinc elements; static and dynamic effects obtained from the battery.
—See also 1455, 3091, 3173, 3289.

2820. **Girardin,** (Jean Pierre Louis). (1803–1884.) Des applications les plus nouvelles de l'électricité à l'industrie aux beaux-arts et à l'économie domestique. 12 pp. 8vo. *Rouen, 1844*
The pamphlet treats chiefly of electro-deposition.

2821. **Hallette,** A. & Edmond **Teisserenc.** Tube propulseur-Hallette, système d'exécution et d'exploitation des chemins de fer par la pression atmosphérique. (Compilation of reports and periodical extracts.) 45 pp. 2 plates. 8vo. (*Paris, 1844?*)
The Hallette pneumatic railway.

2822. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) On the nature of thunderstorms, and on the means of protecting buildings and shipping against the destructive effects of lightning. (Edinburgh Review, No. 162, pp. 444–473.) 8vo. *Edinburgh, 1844*
Review of papers dealing with the protection of ships and buildings against lightning.
—See also 2556.

2823. **Lloyd,** H(umphrey). (1800–1881.) Note on the mode of observing the vibrating magnet. (Proc. Irish Acad., Vol. 2, pp. 115–117.) 8vo. *Dublin, 1844*

2824.— —Description of the theodolite magnetometer. (Proc. Irish Acad., Vol. 2, pp. 608–613.) 8vo. *Dublin, 1844*
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The three variations of magnetic declination are considered.
—See also 2726.

2826. **Peltier,** J(ean) C(harles) A(thanase). (1785–1845.) Considérations générales sur l'éther, suivies d'une notice sur les étoiles filantes. (Extr. du Dict. Univ. d'Hist. Nat.) 12 pp. 8vo. (*Paris, 1844?*)

2827.— —Mémoires sur l'électricité des vapeurs, sur l'électricité atmosphérique et sur les trombes. (L'Institut, Year XII.) 14 pp. 8vo. *Paris, 1844*
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—See also 2544.

2830. **Barlow,** Peter W(illiam). On the comparative advantages of the atmospheric railway system. (Proc. Instit. Civil Engin., Vol. 5, pp. 114–150.) 8 plates. 8vo. *London, 1845*

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—See also 2549.

2835. **Forbes,** James D(avid). (1809–1868.) Researches on the conducting power of the metals for heat and electricity, tending to establish a new analogy between these principles. (Proc. Roy. Soc., Edinburgh, Vol. 1, pp. 396–397.) 8vo. *Edinburgh, 1845*

The conclusion reached is that the order of the metals for the conduction of heat is the same as for the conduction of electricity.
—See also 2680.

2836. **Jones,** William. Popular sketch of the various proposed systems of atmospheric railway. viii+108 pp. ill pl. 12mo. *London, 1845*

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—See also 2712.

2838. **Martens,** M(artin). (1797–1863.) Recherches sur les variations de la force électromotrice du fer. (Nouv. Mém. Acad. Sc., Bruxelles, Vol. 19, pp. 1–46.) 4to. *Brussels, 1845*

The passive state of iron.
—See also 2757.

2839. **Matteucci,** Carlo. (1811–1868.) Electro-physiological researches. First memoir. The muscular current. (Philos. Trans. Roy. Soc., 1845, pp. 283–295.) 4to. *London, 1845*

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ence and intensity of the changes of structure and composition, which constitute the nutrition of the muscle; new method of employing the frog for research purposes.

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—See also 2728.

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—See also 2782.

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The horizontal component of the earth's magnetic force at various altitudes in France and Switzerland.
—See also 2775, 4368.

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The observations indicate a maximum effect on magnetic declination two days after new moon and a minimum two days after full moon.

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—See also 2930, 3817.

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—See also 2549.

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—See also 2728.

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2853.——(The same paper): containing a magnetic survey of the southern hemisphere between the meridians of 0° and 125° East, and parallels of 20° and 70°. (Philos. Trans. Roy. Soc., 1846, pp. 337–432.) 5 plates. 4to. *London, 1846*
—See also 2544.

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—See also 5509.

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—See also 1244, 2968.

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Comment on Faraday's views on the rotation of the plane of polarization by a magnetic field. (See No. 2849.)

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A simple cell consisting of zinc, copper and "pure" water, though hermetically sealed, is found to give a slight current.
—See also 2798.

2858. **Brooke,** Charles. (1804–1879.) On the automatic registration of magnetometers, and other meteorological instruments by photography. (Philos. Trans. Roy. Soc., 1847, pp. 59–78, 5 plates; 1850, pp. 83–92; 1852, pp. 19–24, 1 plate.) 4to.
London, 1847–1852

Description of the artificial light and photographic paper used; use of the barometer and thermometer for automatic records; temperature-coefficients of the magnets employed; automatic temperature compensation of the force-magnetometers.

—See also 1667, 3493.

2859. **Callan,** N(icholas) J. On a new voltaic battery, cheap in its construction and use, and more powerful than any battery yet made, and on a cheap substitute for the nitric acid of Grove's platina battery. (Philos. Mag., Ser. III, Vol. 31, pp. 81–85.) 8vo. *London, 1847*

The author's *cast-iron battery;* Father Callan was Professor of Natural Philosophy in Maynooth College, Ireland.

—See also 2880, 2997, 3121, 3335.

2860. **De la Rive,** Auguste (Arthur). (1801–1873.) Researches on the voltaic arc, and on the influence which magnetism exerts both on this arc and on bodies transmitting interrupted electric currents. (Philos. Mag., Ser. III, Vol. 30, pp. 321–335.) 8vo.
London, 1847

General phenomena of the arc; influence of the electrodes and of a magnetic field; acoustical phenomena.

—See also 2627.

2861. **Grove,** (Sir) W(illiam) R(obert). (1811–1896.) On certain phenomena of voltaic ignition and the decomposition of water into its constituent gases by heat. (Philos. Trans. Roy. Soc., 1847, pp. 1–22.) 1 plate. 4to. *London, 1847*

Remarks on the theory of Grotthus; the spheroidal state; decomposition of water by white-hot platinum.

—See also 2802.

2863. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) Three remarkable examples of the operation of capacious metallic conductors permanently fixed throughout the masts and hull in the defending ships *Fishgard, Scylla,* and *Dido* from the destructive agency of lightning. 16 pp. 2 plates. 8vo. *London, 1847*

Examples of ships preserved in thunderstorms by means of lightning-conductors.

—See also 2556.

2863. **Hatcher,** W(illiam) H(enry). Account of the electric telegraph now in use for railways and other purposes. 20 pp. ill. 12mo. *London, 1847*

—See also 1115, 5001.

2864. **Kolbe,** (Adolph Wilhelm) H(ermann). (1818–1884.) On the decomposition of valerianic acid by the voltaic current. (Philos. Mag., Ser. III, Vol. 31, pp. 348–350.) 8vo.
London, 1847

Preliminary notice of observed changes.

2865. **Lefroy,** (Sir) J(ohn) H(enry). (1817–1890.) Letter to Lieut.-Colonel Sabine on a great magnetic disturbance on the 24th of September 1847. (Philos. Mag., Ser. III, Vol. 31, pp. 346–347.) 8vo. *London, 1847*

The observed disturbance in declination is given at S. 4° 2′.
—See also 2965.

2866. **Loomis,** Elias. (1811–1889.) Letter to Lieut.-Colonel Sabine, on the determination of differences of longitude made in the United States by means of the electric telegraph, and on projected observations for investigating the laws of the great North American storms. (Philos. Mag., Ser. III, Vol. 31, pp. 338–341.) 8vo. *London, 1847*

Difference of longitude between New York, Philadelphia and Washington determined by the electric telegraph.
—See also 1365, 3100, 3190, 3301, 3459, 3643.

2867. **Matteucci,** Carlo. (1811–1868.) Electro-physiological researches. 4th memoir. The physiological action of the electric current. (Philos. Trans. Roy. Soc., 1847, pp. 483–499.) 4to. *London, 1847*

The electric discharge traversing a nerve awakens muscular contraction and produces a variation in the excitability of the nerve.

2868.— —(The same paper.) 5th Series, Part I. Upon induced contractions. Part II. On the phenomena elicited by the passage of the current through the nerves of a living animal, or of an animal recently killed, according to the direction of the current. (Philos. Trans. Roy. Soc., 1847, pp. 231–237.) 4to. *London, 1847*

Connection between nervous influence and the passage of the electric current according to the direction of the latter.

2869.— —(The same paper.) 6th Series. Laws of the electric discharge of the torpedo and other electric fishes; theory of the production of electricity in these animals. (Philos. Trans. Roy. Soc., 1847, pp. 239–241.) 4to. *London, 1847*

2870.— —(The same paper.) 7th Series. Upon the relation between the intensity of the electric current, and that of the corresponding physiological effect. (Philos. Trans. Roy. Soc., 1847, pp. 243–248.) 1 plate. 4to. *London, 1847*

Experiments showing that the electro-physiological effect is proportional to the intensity of the current.
—See also 2728.

2871. **Matthiessen,** Adolphe. Détermination expérimentale du pouvoir rotateur, par influence magnétique, d'un grand nombre de composés transparents. (Comptes rendus, Acad. Sc., Paris, Vol. 24, pp. 969–973.) 4to. *Paris, 1847*

Experiments bearing on the magnetic rotation of the plane of polarization. (Autograph copy).

2871a.——Étude des effets rotateurs produits par les poles d'un électro-aimant sur les solides transparents. (Deuxième Mémoire.) (Comptes rendus, Acad. Sc., Paris, Vol. 25, pp. 20–24.) 4to. *Paris, 1847*

(Autograph copy).

2871b.——Liste des composés vitrifiés qui produisent une rotation du plan de polarisation, plus forte que le verre pesant de Faraday. (Comptes rendus, Acad. Sc., Paris, Vol. 25, pp. 172–175.) 4to. *Paris, 1847*

(Autograph copy.)

2872. **Norton,** William A(ugustus). (1810–1883.) On terrestrial magnetism. (Amer. Journ. Sc. & Arts, Ser. II, Vol. 4, pp. 1–12+ 207–230.) 8vo. *New Haven, 1847*

The author develops a theory of terrestrial magnetism founded on the distribution of heat over the globe.
—See also 3407.

2873. **Ronalds,** (Sir) Francis. (1788–1873.) On photographic self-registering meteorological and magnetical instruments. (Philos. Trans. Roy. Soc., 1847, pp. 111–117.) 2 plates. 4to. *London, 1847*

The self-registering instruments referred to are the barometrograph, thermograph, declination-magnetograph and electrograph.
—See also 2534.

2874. **Sabine,** (Sir) Edward. (1788–1883.) On the diurnal variation of the magnetic declination at St. Helena. (Philos. Trans. Roy. Soc., 1847, pp. 51–57.) 2 plates. 4to. *London, 1847*

These magnetic observations cover the period 1841-1845.
—See also 2544.

2875. **Solly,** E(dward). (1819–1886.) On the applications of electricity to practical purpose. (Pharmac. Journ. Trans., Vol. 6, pp. 400–412.) ill. 4to. *London, 1847*

Remarks on Strada's *Prolusiones* (see No. 90), on Ronalds, Steinheil, and Henry.
—See also 1107.

2876. **Zantedeschi,** (Francesco). (1797–1873.) On the motions presented by flame when under electro-magnetic influence. (Philos. Mag., Ser. III, Vol. 31, pp. 421–424.) 8vo. *London, 1847*

Experiments made by the author in continuation of Padre Bancalari's discovery of the repulsion of flames by a strong magnetic field.

2877. **Brett** and Little's electric inventions. (Chambers' Edinburgh Journ., 1847, pp. 305–307.) 4to. *Edinburgh, 1847*

Description of the "Electro-magnetic conserver," and other telegraphic inventions.

2878. **Explanation** of the construction and method of working the needle telegraph. 16 pp. ill. pl. 16mo. *Brentwood, (1847)*

2879. **Handbook** to the electric telegraph; being a popular explanatory treatise on the construction, nature, and powers, of this wonder-working instrument, with a full account of its origin and progress; also a drawing and explanation of the electric clock. Second edition. 27 pp. ill. pl. 12mo. *London, 1847*
The telegraph mileage in England and in the United States for the time.

2880. **Callan,** Nicholas J. On the construction and power of a new form of galvanic battery. (Philos. Mag., Ser. III, Vol. 33, pp. 49–53.) 8vo. *London, 1848*
Description of the author's *cast-iron battery.*
—See also 2859.

2881. **Goodman,** John. On a new and practical voltaic battery of the highest powers, in which potassium forms the positive element. (Philos. Mag., Ser. III, Vol. 33, pp. 207–211.) 8vo. *London, 1848*
The author's battery illustrated by experiments; reference to Gassiot's water-battery of 3,500 cells.
—See also 2962.

2882. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) Instructions for the application of permanently fixed conductors of lightning to Her Majesty's ships. 19 pp. ill. 6 plates. 8vo. *London, 1848*
The description is illustrated by colored plates.
—See also 2556.

2883. **Lloyd,** Humphrey. (1800–1881.) An account of a method of determining the total intensity of the earth's magnetic force in absolute measure. (Philos. Mag., Ser. III, Vol. 33, pp. 212–217.) 8vo. *London, 1848*

2883a.——(The same paper.) Abstract. (Proc. Irish. Acad., Vol. 4, pp. 57–63.) 8vo. *Dublin, 1848*

2884.——Circular for the information of the directors of the British Colonial Magnetical Observatories. 7 pp. 8vo. *Dublin, 1848*
The circular contains the theory of the induction magnetometer.

2885.——On the corrections required in the measurement of magnetic declination. (Proc. Irish Acad., Vol. 4, pp. 219–229.) 8vo. *Dublin, 1848*
The error arising from the torsion of the suspension thread is taken into account. (Autograph copy, dedicated to Prof. Challis.)
—See also 2726.

2886. (**Morgan** and **Barber.**) The aurora borealis of October 24, 1847. 20 pp. 12 colored plates. 8vo. (*Cambridge, 1848?*)
Detailed account of the aurora as seen at Cambridge Observatory (England) with colored illustrations.

2887. **Phillips,** Reuben. An account of some experiments on volta-electric induction. (Philos. Mag., Ser. III, Vol. 33, pp. 260–267.) 8vo. *London, 1848*
Experiments similar to those of Prof. Henry of the Smithsonian Institution on induced currents at "making" and "breaking."
—See also 2904.

2888. **Pluecker,** (Julius). (1801–1868.) Letter to Faraday on diamagnetism. (Philos. Mag., Ser. III, Vol. 33, pp. 48–49.) 8vo. *London, 1848*

Note on some analogies between magnetism and diamagnetism.
—See also 1164, 3104, 3141.

2889. **Wartmann,** Elie (François). (1817–1886.) Does induction affect the acoustic properties of elastic bodies? (Philos. Mag., Ser. III, Vol. 33, pp. 275–278.) 8vo. *London, 1848*

Electric or magnetic induction has no appreciable action on the elasticity of such bodies as copper, brass, soft-iron.

2890.——On the non-propagation by radiation of dynamic electricity. (Philos. Mag., Ser. III, Vol. 33, pp. 89–94.) 8vo. *London, 1848*

Current electricity does not possess the property of being reflected, refracted or polarized.

2891.——On the relations of electricity with bodies in the spheroidal state and on some properties of those bodies. (Philos. Mag., Ser. III, Vol. 33, pp. 439–446.) 8vo. *London, 1848*
—See also 1033, 3522.

2892. **Electric** telegraphs. (Companion to the Almanac for 1848, pp. 67–81.) 12mo. *London, 1848*

Bain's "chemical" telegraph; telegraph mileage in the United states.

2893. **Greenwich,** England. Royal Observatory. Results of magnetical and meteorological observations. Report (Greenwich Astronomical Observ. Appendix). 67 pp. 4to. *Greenwich, 1848*

Tabulated readings of the magnetometers.
—See also 2909, 4366.

2894. **Angelelli,** (Marchioness) Massimiliano. An veteres Italiae philosophi nullam de vi electrica ac de fulminum potissimum proprietatibus scientiam tenerent. (Novi commentarii Acad. Sc. Instit. Bononiensis, Vol. 9, pp. 1–10.) 4to. *Bologna, 1849*

Short paper on lightning and thunder according to ancient writers.

2895. **Barlow,** W(illiam) H(enry). On the cause of the diurnal variations of the magnetic needle. (Philos. Mag., Ser. III, Vol. 34, pp. 344–347.) 8vo. *London, 1849*

Note on the electric origin of the diurnal variations of the magnetic needle.

2896.——On the spontaneous electrical currents observed in the wires of the electric telegraph. (Philos. Trans. Roy. Soc., 1849, pp. 61–72.) 3 plates. 4to. *London, 1849*

Early observations on earth-currents tabulated and plotted.
—See also 5006.

2897. **(Clark,** Josiah Latimer.) (1822–1898.) General description of the Britannia and Conway tubular bridges on the Chester and Holyhead Railway. 34 pp. 8vo. *London, 1849*

Latimer Clark was assistant engineer on the construction of the bridges from 1848-1850. (See No. 1169.)

2897a.——Seventh edition. 40 pp. ill. 1 plate. 8vo. *London, 1850*
—See also 1509, 3228, 3282, 3387, 3439, 3532, 3573, 3575, 3601, 3684, 3719, 3819, 3853, 3871, 3992, 4075, 4120, 4162, 4172, 4262, 4341, 4427, 4437, 4453, 4509, 4520, 4608, 4777, 5014, 5019, 5023, 5028 to 5031, 5039, 5047 to 5049, 5051, 5052, 5054 to 5056, 5058 to 5062, 5064 to 5067, 5071, 5074, 5079, 5087 to 5092, 5097, 5101, 5108, 5114, 5118 to 5120, 5124, 5127, 5349, 5388, 5407, 5411, 5416, 5490, 5505, 5594, 5731, 5759, 5780, 5809, 5828, 5849.

2898. **Despretz,** (César Mansuète). (1792–1863.) Note sur la déviation de l'aiguille aimantée, par l'action des corps chauds et froids. (Comptes rendus, Acad. Sc., Paris, Vol. 29, pp. 225–227.) 4to. *Paris, 1849*
Deflection of a galvanometer needle by the heat of the hand.
—See also 903, 2914, 3280.

2899. **Feilitzsch** (Fabian Carl Ottokar). (1817–1885.) Eine Methode, galvanische Stroeme nach absolutem Maasse zu messen. (Ann. Phys. und Chem., Vol. 78, pp. 21–35.) 1 plate. 8vo. *Berlin, 1849*
The method consists in comparing the magnetism developed in a disc with that of a permanent magnet.

2900. **Grove,** (Sir) William R(obert). (1811–1896.) On the effect of surrounding media on voltaic ignition. (Philos. Mag., Ser. III, Vol. 35, pp. 114–126.) 8vo. *London, 1849*
Platinum wire heated by an electric current while surrounded by an atmosphere of hydrogen, oxygen, nitrogen, carbonic acid, coal gas, etc., showing the cooling effect of the gases used.

2900a.——(The same paper.) (Philos. Trans. Roy. Soc., 1849, pp. 49–59.) 4to. *London, 1849*

2901.——On the direct production of heat by magnetism. (Philos. Mag., Ser. III, Vol. 35, pp. 153–154.) 8vo. *London, 1849*
When a bar of iron or other magnetic substance is magnetized, its temperature is raised; the author's well-known experiment showing the orientation of soft-iron filings, suspended in water, by the passage of a current in the magnetizing helix.
—See also 2802.

2902. **(Head,** (Sir) Francis Bond.) (1793–1875.) Highways and dry-ways; or, The Britannia and Conway tubular bridges. 83 pp. 12mo. *London, 1849*
Description of the Britannia Bridge across the Menai Strait. (See No. 1156.)
—See also 1157.

2903. **Matteucci,** Carlo. (1811–1868.) Mémoire sur la propagation de l'électricité dans les corps solides isolants. (Ann. Chim. et Phys., Ser. III, Vol. 27, pp. 133–171.) 1 plate. 8vo. *Paris, 1849*
Action of an electrified body on a neighboring non-conductor; rapidity of propagation of a negative charge.
—See also 2728.

2904. **Phillips,** Reuben. On electricity and steam. (Philos. Mag., Ser. III, Vol. 35, pp. 490–497.) 8vo. *London, 1849*
Experiments on the electrostatic effects of escaping steam with application to meteorology.
—See also 2887.

2905. **Quetelet,** (Lambert) A(dolphe Jacques). (1796–1874.) Rapport adressé à M. le Ministre de l'Intérieur, sur l'état et les travaux de l'observatoire Royale. 12 pp. 8vo. *Brussels, 1849*

Note on atmospheric electricity and terrestrial magnetism.

2906.— —Sur le climat de la Belgique. De l'électricité de l'air. 76 pp. Folio. *Brussels, 1849*

Observations of atmospheric electricity made under the direction of the author.

2906a.— —(The same paper.) Deuxième partie: Direction, intensité, durée et caractères distinctifs des vents. 75 pp. Folio. *Brussels, 1848*

Wind observations: their direction, intensity and duration.
—See also 2649.

2907. **Sabine,** (Sir) Edward. (1788–1883.) Contributions to terrestrial magnetism: containing a map of the magnetic declination for 1840, in the Atlantic Ocean, between the parallels of 60° North and 60° South latitude. (Philos. Trans. Roy. Soc., 1849, pp. 173–234.) 2 plates. 4to. *London, 1849*

2908.— —Remarks on De la Rive's Theory of the causes which produce the diurnal variation of the magnetic declination. (From Proc. Roy. Soc., London, Vol. 5, pp. 821–825.) (Philos. Mag., Ser. III, Vol. 34, pp. 466–469.) 8vo. *London, 1849*

The aim of the paper is to show how De la Rive's theory of inequalities of temperature fails to explain the daily changes observed in the magnetic declination at any station.
—See also 2544.

2909. **Greenwich,** England. Royal Observatory. Description of the instruments and processes used in the photographic self-registration of the magnetical and meteorological instruments at the Royal Observatory. 10 pp. 3 plates. 4to. *London, 1849*

The description is accompanied by various photographic records.
—See also 2893.

2910. **Harris,** (Sir) William Snow. (1792–1867.) Electricity; being a concise exposition of the general principles of electrical science, and the purposes to which it has been applied.—Regulations of the Electric Telegraph Co. 1849.—**Moigno** (L'Abbé) (François Napoléon Marie). (1804–1884.) Traité de télégraphie électrique, renfermant son histoire, et la description des appareils. Paris, 1849. (Edinburgh Review, 1849, pp. 388–434.) 8vo. *Edinburgh, 1849*

A magazine-review of the two important works; definite meaning of such terms as quantity, tension, polarity. (See No. 1161.)
—See also 2556, 3310.

2911. **Birt,** William Radcliffe. (1804–1881.) On the connexion of atmospheric electricity with the condensation of vapour. (Philos. Mag., Ser. III, Vol. 36, pp. 161–171.) 8vo. *London, 1850*

Formation of clouds, production of rain, development of electricity.

2912.——Report on the discussion of the electrical observations at Kew. (Report, British Ass. Adv. Sc. 1849, pp. 113–119.) 6 plates. 8vo. *London, 1850*

The report embraces the period 1843-1848.

2913. **Bombay.** Magnetical Observatory. Observations, for 1847. 11 tables. Folio. *Bombay, 1850*

Description of the observatory; instruments used; observations made.

2914. **Despretz,** C(ésar Mansuète). (1792–1863.) Cinquième communication sur la pile. Quelques nouvelles expériences sur le charbon. Longuers de l'arc voltaique. (Comptes rendus, Acad. Sc., Paris, Vol. 30, pp. 367–373.) 4to. *Paris, 1850*

Length of the electric arc with varying battery power when the carbons are vertical and also when horizontal; 600 Bunsen cells were used, variously grouped.

2914a.——Sixième communication sur la pile. (I.) Note sur le phénomène chimique et sur la lumière de la pile à deux liquides. (Comptes rendus, Acad. Sc., Paris, Vol. 31, pp. 418–422.) 4to. *Paris, 1850*

Electrochemical work done inside and outside a battery compared with the magnetic work as indicated by a tangent galvanometer.

2914b.——Septième communication sur la pile à deux liquides. Sur l'action chimique. (Comptes rendus, Acad. Sc., Paris, Vol. 33, pp. 185–193.) 4to. *Paris, 1851*

The water voltameter used in connection with Bunsen and Daniell batteries.

2914c.——Huitième communication sur la pile. (Comptes rendus, Acad. Sc., Paris, Vol. 34, pp. 737–746.) 4to. *Paris, 1852*

Experiments showing the weakening of the current from a Bunsen and a Daniell battery.

2914d.——Neuvième communication sur la pile. (Comptes rendus, Acad. Sc., Paris, Vol. 34, pp. 781–789.) 4to. *Paris, 1852*

Remarks on Ohm's law.

2914e.——Dixième communication sur la pile. (Comptes rendus, Acad. Sc., Paris, Vol. 35, pp. 449–459.) 4to. *Paris, 1852*

Note on the tangent galvanometer.

—See also 2898.

2915. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) Letter on the preservation of public buildings from the destructive agency of lightning. 12 pp. 8vo. *London, 1850*

Short description of some churches that were struck by lightning.

—See also 2556.

2916. **Hearder,** Jonathan N(ash). (1809–1876.) On the application of cast-iron as a substitute for steel, in the construction of very powerful permanent magnets, with a specimen of a cast-iron magnet of great power, and a detail of some peculiar

phenomena connected with its magnetic properties. (Trans. Polytechn. Soc., Cornwall, 1850, pp. 16–28.) 8vo.
Cornwall, 1850
The author's object was to introduce a material for the construction of permanent magnets which would combine cheapness and efficiency.
—See also 1360, 3028, 3061, 3096, 3132, 3188, 3349, 3398, 3451, 3639, 3665.

2917. **Henry,** Joseph. (1797–1878.) Analysis of the dynamic phenomena of the Leyden jar. (Proc. Amer. Adv. Sc., 1850, pp. 377–378.) 8vo. *Washington, 1850*
All the phenomena observed could be referred, says the author, to a series of *electric oscillations* in the discharge circuit of the jar.
—See also 2667.

2918. **Joule,** James Prescott. (1818–1889.) On the mechanical equivalent of heat. (Philos. Trans. Roy. Soc., 1850, pp. 61–82.) 4to. *London, 1850*
The determination when water was used gave 772.692 foot-lbs; with mercury, the value found was 774.083; with cast-iron, 774.987. The author considers the value derived from the friction of water *viz.* 772,692 as the most reliable.

2918a.——New determination of the mechanical equivalent of heat. (Philos. Trans. Roy. Soc., Vol. 169, pp. 365–383.) 3 plates. 4to. *London, 1879*
The method used was that of the electric calorimeter; the value obtained being 782.5 foot-lbs. per degree F. instead of 772.6 obtained from the friction of fluids.
—See also 2363, 3001, 3063, 3298, 3427, 3486, 3573.

2919. **Matteucci,** Carlo. (1811–1868.) Electro-physiological researches. 8th series. (On the conductibility of muscles and nerves.) (Philos. Trans. Roy. Soc., 1850, pp. 287–296.) 4to.
London, 1850
Analogy between electricity and nervous force.

2920.——(The same paper.) 9th series. On induced contraction. (Philos. Trans. Roy. Soc., 1850, pp. 645–649.) 1 plate. 4to.
London, 1850
"Induced contraction" is an electrical phenomenon developed in the act of contraction and lasting only for an instant.
—See also 2728.

2921. **Molinier,** Victor. Notice sur l'usage de la boussole au XIII^e^ siècle, et sur une loi du Code las siete Partidas d'Alfonse X, roi de Léon et de Castille, dans laquelle il est question de l'aiguille de mer. (Mém. Acad. Sc., Toulouse, Ser. III, Vol. 6, pp. 193–209.) 8vo. *Toulouse, 1850*
The origin of the mariner's compass briefly considered: the author refers to Alphonso X, King of Spain; Guyot de Provins, Brunetto Latini and Cardinal Jacques de Vitry.

2922. **Quetelet,** (Lambert) A(dolphe Jacques). (1796–1874.) Sur l'électricité atmosphérique. (Bull. Acad. Sc., Belgique, Vol. 17, pp. 3–13.) 1 plate. 8vo. *Brussels, 1850*
Letters from Matteucci and Peltier on atmospheric electricity.
—See also 2649.

2923. **Ronalds,** (Sir) Francis. (1788–1873.) Report concerning the Observatory of the British Association at Kew, from August 9, 1848, to September 12, 1849. (Report, British Ass. Adv. Sc., 1849, pp. 120–142.) 5 plates. 8vo. *London, 1850*
Brief account of the experiments and operations conducted at the Kew Observatory during the year 1848-1849.

2923a.— —(The same paper) from August 1, 1850 to July 1, 1851. (Report, British Ass. Adv. Sc., 1852, pp. 335–370.) 6 plates. 8vo. *London, 1852*
Remarks on instruments used in recording the electrical conditions of the atmosphere.
—See also 2534.

2924. **Tyndall,** (John) (1820–1893) & (Karl) Hermann **Knoblauch** (1820–1895). On the magneto-optic properties of crystals. (Second memoir.) (Philos. Mag., Ser. III, Vol. 37, pp. 1–33.) 8vo. *London, 1850*
Memorable paper in which the authors show that a paramagnetic crystal tends to place its axis of greatest density along the lines of force of a magnetic field.
—See also 2950.

2925. **Verdet,** (Marcel) E(mile). (1824–1866.) Note sur les courants induits d'ordre supérieur. (Ann. Chim. Phys., Ser. III, Vol. 29, pp. 501–506.) 8vo. *Paris, 1850*
Note on induced currents of various orders; also Henry's view of the *alternating* nature of the Leyden jar discharge.
—See also 2951, 2989, 3374.

2926. **Electricity**—Magnetism—Electro-Magnetism. (Chambers Information for the people, pp. 257–320+97–128.) L. 8vo. *Edinburgh, (1850?)*
General articles on electricity, magnetism and electro-magnetism.

2927. **Becquerel,** (Alexandre) Edmond. (1820–1891.) De l'action du magnétisme sur tous les corps. (3. Memoire.) (Ann. Chim. Phys., Ser. III, Vol. 32, pp. 68–112.) 8vo. *Paris, 1851*
Diamagnetism considered to be due to a differential action.
—See also 1439, 3118, 3164.

2928. **Billet,** (Felix). (1800–1882.) Sur la constitution de la lumière polarisés et la vraie cause des changements qui s'introduisent dans la différence des phases de deux rayons polarisés. (Mém. Acad. Sc., Dijon, Année 1851, pp. 73–83.) 8vo. *Dijon, 1851*
—See also 1196, 2982.

2929. **Boucherie.** Nota betrekkelijk de bereiding van sparren palen, tegen bederf, volgens de vinding van den heer Boucherie. (Translated by J. Vinchent.) 15 pp. ill. 2 tables. 8vo. *(1851?)*
Notes on the preparation of telegraph poles.

2930. **Broun,** J(ohn) A(llan). (1817–1879.) On the combined motions of the magnetic needle and on the Aurora Borealis. (Proc. Roy. Soc., Edinburgh, Vol. 2, pp. 334–350.) 2 plates. 8vo. *Edinburgh, 1851*
New hypothesis proposed by the author.
—See also 2846.

2931. **Duchenne,** (Guillaume Benjamin Amand). Application de la galvanisation localisée à l'étude des fonctions musculaires. (Extrait, Bull. Acad. Nat. de Médecine, Vol. 16, pp. 609–622.) 16 pp. 8vo. *Paris, 1851*

2931a.——Exposition d'une nouvelle methode d'électrisation dite galvanisation localisée. Part II. (Extrait, Arch. génér. le Médecine.) 45 pp. 8vo. *Paris, 1851*

Description of some appliances used in the local application of the electric current.

2932.——Du choix des appareils d'induction au point de vue de leur application à la thérapeutique et à l'étude de certains phénomènes électro-physiologiques et pathologiques—Appareils Volta et magnéto-électriques (Faradiques) à double courant. (Extrait, Bull. Acad. Nat. de Médecine, Vol. 16, pp. 656–672.) 16 pp. 8vo. *Paris, 1851*

The author's induction coil and magneto-machine for medical purposes.
—See also 2973, 3020.

2933. **Electric Telegraph Co.** Register map indicating conditions of the atmosphere on the same day in several parts of Great Britain. 4to. *London, 1851*

—See also 1219, 4380, 4384, 4388, 4521, 4537, 4663, 4665, 4667, 4684, 4771, 5000, 5037, 5513.

2934. **Elliot,** Charles Morgan. (1815–1851.) Magnetic survey of the Eastern Archipelago. (Philos. Trans. Roy. Soc., 1851, pp. 287–331+clvii.) 1 map, 8 plates. 4to. *London, 1851*

Description of instruments used; tabulated magnetic data.

2935. **Fritsch,** Karl. (1812–1879.) Ueber die Temperatur-Verhaeltnisse und die Menge des Niederschlages in Boehmen. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1851, pp. 412–432.) 8vo. *Vienna, 1851*

Short paper on the temperature and amount of precipitation in Bohemia.
—See also 3128.

2936. **Gould,** B(enjamin) A(pthorp). (1824–1896.) On the velocity of the galvanic current in telegraph wires. (Amer. Journ. Sc. and Arts, Ser. II, Vol 11, pp. 67–82, 153–164.) 1 plate. 8vo. *New Haven, 1851*

The velocity deduced from the experiments described lies between 12,000 and 20,000 miles per second according to the electrical circumstances of the line.
—See also 1743.

2937. **Henry,** Joseph. (1797–1878.) On the theory of the so-called imponderables. (Proc. Amer. Soc. Adv. Sc., 1851, Part II, pp. 84–91.) 8vo. *Washington, 1851*

A few general considerations: suspicion of the oscillatory nature of the Leyden jar discharge, and emission of *electric waves,* p. 89.
—See also 2667.

2938. **Masson,** A(ntoine) P(hillibert). (1806–1860.) Études de photométrie électrique. (Extrait, Ann. Chim. Phys., Ser. III, Vol. 31.) 32 pp. 1 plate. 8vo. *Paris, (1851?)*
Spectra of metals. (Autograph copy.) (See No. 1078bis.)
—See also 941.

2939. **Matteucci,** C(arlo). (1811–1868.) Sullo sviluppo dell' elettricita nella combinazione degli acidi colle basi. (Ann. Univ. Toscana, Sc. Cosmolog., Vol. 2, pp. 187–200.) 4to. *Pisa, 1851*
—See also 2728.

2940. **Morse,** Samuel F(inley) B(reese). (1791–1872.) Exposure of the conduct of Dr. Charles T. Jackson, leading to his discharge from the government service; also justice to Messrs. Foster and Whitney. 32 pp. 8vo *(1851?)*
—See also 1687, 5045, 5076.

2941. **Sabine,** (Sir) Edward. (1788–1883.) On periodical laws discoverable in the mean effects of the larger magnetic disturbances. (Philos. Trans. Roy. Soc., 1851, pp. 123–139.) 4to. *London, 1851*
It is inferred that magnetic disturbances must be attributed to general causes inasmuch as they are found to prevail on the same days in different and remote parts of the globe; also that their operation in any particular locality is regulated by a law which respects the hour of the place.

2941a.——(The same paper.) No. II. (Philos. Trans. Roy. Soc., 1852, pp. 103–124.) 4to. *London, 1852*
Analysis of observations taken at Toronto and Hobarton.

2941b.——(The same paper.) No. III. (Philos. Trans. Roy. Soc., 1856, pp. 357–374.) 4to. *London, 1856*
Periodical inequality of the larger magnetic disturbances, annual and diurnal.

2942.——On the annual variation of the magnetic declination at different periods of the day. (Philos. Trans. Roy. Soc., 1851, pp. 635–641.) 1 plate.. 4to. *London, 1851*
Discussion of the observations taken at Toronto, Hobarton, Cape of Good Hope and St. Helena.
—See also 2544.

2943. **Schoenbein,** C(hristian) F(riedrich). (1799–1868.) On some secondary physiological effects produced by atmospheric electricity. (Medico-Chirurg. Trans., London, Vol. 34, pp. 205–220.) 8vo. *London, 1851*
Properties of ozone; methods of producing it; ozone was discovered by the author in 1839.
—See also 2732.

2944. **Singer,** Hermann. Bestimmung der elektromotorischen Kraft einer galvanischen Kette. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., 1851, pp. 411–412.) 8vo. *Vienna, 1851*
Note on the determination of the *e. m. f.* of a battery.

2945. **Sturgeon,** William. (1783–1850.) On lightning and lightning conductors. (Mem. Manchester Phil. Soc., Vol. 9, pp. 56–79.) 8vo. *Manchester, 1851*
The author expresses some doubt as to the correctness of Franklin's views on the efficiency of pointed conductors.
—See also 925.

2946. **Thomson,** (Sir) William. (Lord Kelvin.) (1824–1907.) Application of the principle of mechanical effect to the measurement of electro-motive forces, and of galvanic resistance in absolute units. (Philos. Mag., Ser. IV, Vol. 2, pp. 551–562.) 8vo. *London, 1851*

This important paper deals with the measurement of electro-motive force in absolute units.

2947.——A mathematical theory of magnetism. (Philos. Trans. Roy. Soc., 1851, pp. 243–285.) 4to. *London, 1851*

General definitions and laws followed by full mathematical treatment.

2948.——On the theory of magnetic induction in crystalline and non-crystalline substances. (Philos. Mag., Ser. IV, Vol. 1, pp. 177–186.) 8vo. *London, 1851*

The paper contains a number of important definitions besides deductions from Poisson's theory.

2949.——On the mechanical theory of electrolysis. (Philos. Mag., Ser. IV, Vol. 2, pp. 429–444.) 8vo. *London, 1851*

One of the author's epoch-making papers showing the relation between the e. m. f., the electrochemical equivalent and the mechanical equivalent of the chemical effects produced by the consumption of a given amount of the materials of a battery.

—See also 1085, 2987, 3008, 3038, 3070, 3108, 3150, 3211, 3263, 3371, 3265, 3378, 3427, 3486, 3565, 3573, 3613, 3743, 3770, 3800, 3974, 4046, 4162, 4400, 4640, 4642, 4917, 5083, 5386, 5398, 5403, 5490.

2950. **Tyndall,** John. (1820–1893.) On the laws of magnetism. (Philos. Mag., Ser. IV, Vol. 1, pp. 265–295.) 8vo. *London, 1851*

The mutual attraction between a magnet and a sphere of soft iron.

—See also 1586, 2924, 2967, 2988, 3009, 3041, 3072, 3152, 3214, 3763, 3804, 3849, 4048, 4835.

2951. **Verdet,** (Marcel) E(mile). (1824–1866.) Recherches sur les phénomènes d'induction produits par le mouvement des métaux magnétiques ou non-magnétiques. (Ann. Chim. Phys., Ser. III, Vol. 31, pp. 187–217.) 1 plate. 8vo. *Paris, 1851*

Magnetic induction is not an instantaneous phenomenon.

—See also 2925.

2952. **Chamber's** Papers for the people. Electric communications. 31 pp. 8vo. *London, 1851*

2953. **Gutta-Percha,** its discovery, history and manifold uses. 48 pp. ill. 1 plate. 12mo. *London, 1851*

Written for the purpose of popularizing the (then) new material for electrical insulation.

2954. **The Electric Telegraph.** Chart 57x88 cm. *London, 1851*

Diagrams of the double needle-telegraph as used in England at the end of 1850.

2955. **Baxter,** H(enry) F(orster). An experimental inquiry undertaken with the view of ascertaining whether any, and what signs of current-force are manifested during the organic pro-

cess of secretion in living animals. (Philos. Trans. Roy. Soc., 1852, pp. 279–288.) 4to. *London, 1852*
Experimental evidence of electrical manifestations during the process of secretion.
—See also 1480, 2994.

2956. **Blanchard,** E(dward) L(eman). The song of the electric telegraph. Set to music by Wm. Thorold Wood. 5 pp. Folio. *London, (1852?)*

2957. **Brande,** W(illiam) T(homas). (1788–1866.) On electro-magnetic clocks. (Proc. Roy. Instit., Great Britain, Vol. 1, pp. 109–111.). 8vo. *London, 1852*
Diagrams of the mechanism adopted.
—See also 2516.

2958. **Channing,** William F. On the municipal electric telegraph especially in its application to fire-alarms. (Amer. Journ. Sc. & Arts, Ser. II, Vol. 13, pp. 58–83.) ill. 8vo. *New Haven, 1852*
Description of the apparatus of Moses G. Farmer as used in the City of Boston. (Autograph copy, dedicated to Prof. Buff.)
—See also 1317.

2959. **Clausius,** R(udolph Julius Emmanuel). (1822–1888.) Ueber die von Grove beobachtete Abhaengigkeit des galvanischen Gluehens von der Natur des umgebenden Gases. (Ann. Phys. und Chem., Vol. 87, pp. 501–513.) 8vo. *Berlin, 1852*
Conduction of heat through different gases.
—See also 1669, 3055.

2960. **Donovan,** M(ichael). (1790– ? .) On the supposed identity of the agent concerned in the phaenomena of ordinary electricity, voltaic electricity, electromagnetism, magneto-electricity, and thermo-electricity. (Philos. Mag., Ser. IV, Vol. 3, pp. 335–347.) 8vo. *London, 1852*
Estimate of the quantity of electricity that passes in Leyden jar discharges; Faraday's electrical investigations.
—See also 2526.

2961. **Faraday,** Michael. (1791–1867.) On the lines of magnetic force. (Proc. Roy. Instit., Great Britain, Vol. 1, pp. 105–108.) 8vo. *London, 1852*
—See also 2549.

2962. **Goodman,** J(ohn). On the identity of light, heat, electricity, magnetism, and gravitation. (Mem. Manchester Philos. Soc., Vol. 10, pp. 155–171.) 4to. *London, 1852*
"These experiments indicate and prove the identity of galvanic and voltaic force."
—See also 2881.

2963. **Grove,** (Sir) W(illiam) R(obert). (1811–1896.) On the electro-chemical polarity of gases. (Philos. Trans. Roy. Soc., 1852, pp. 87–101.) 1 plate. 4to. *London, 1852*
Experiments affording a new link in the chain of analogy connecting dielectric induction with electrolysis.
—See also 2802.

2964. **Kohlrausch,** (Rudolph Hermann Arndt). (1809–1858). On the electroscopic properties of the voltaic circuit; being an experimental verification of the theory of Ohm. (Philos. Mag., Ser. IV, Vol. 3, pp. 321–330.) 8vo. (See No. 2967.)
London, 1852

—See also 1400, 2974, 3002.

2965. **Lefroy,** (Sir) J(ohn) H(enry). (1817–1890.) On the irregular fluctuations of the magnetical elements at the stations of magnetical observation in North America. 13 pp. 1 plate, 1 table. 8vo. *Albany, 1852*
The author points out that for the American Continent there would seem to be two daily periods of maximum disturbance in magnetic declination.
—See also 2865.

2966. **Pole,** William. (1814–1900.) On the motion of fluids in pipes. (Reprinted from The Journ. of Gas Lighting, 1852.) 15 pp. 12mo. *London, 1852*
Pamphlet of theoretical views and practical rules. (Autograph copy.)
—See also 4279.

2967. **Tyndall,** John. (1820–1893.) Reports on the progress of the physical sciences. (Philos. Mag., Ser. IV, Vol. 3, pp. 321–330.) 8vo. *London, 1852*
Reception of Ohm's theory; Kohlrausch's experimental verification of Ohm's law. (See No. 2964.)
—See also 2950.

2968. **Wilson,** George. (1818–1859.) The chemistry of the stars; an argument touching the stars and their inhabitants. 50 pp. 12mo. *London, 1852*
—See also 2855.

2969. **Caoutchouc** and gutta-percha. 202 pp. ill. 1 plate. 16mo.
London, 1852
The history and manufacture of insulating substances.

2970. **Elektrische** Telegraphie. (Unsere Zeit, Vol. 3, pp. 401–434.) 4to.
Stuttgart, 1852
Short history of the electric telegraph.

2971. **Clippings** from the *Daily News, The Times, The Express, The Morning Chronicle* and other publications, referring to electrical matters. 64 pp. 4to. *1852*

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Advantages arising from the study of science.
—See also 1169, 3494, 3600, 3928, 4119, 4535, 5012.

2973. **Duchenne,** (Guillaume Benjamin Amand). De la valeur de l'électrisation localisée comme traitement de l'atrophie musculaire progressive. (Extrait, Bull. Génér. de Thérapeutique.) 24 pp. 8vo. *Paris, (1853)*
Some pathological and therapeutic uses of the current.
—See also 2931.

2974. **Kohlrausch,** R(udolph Hermann Arndt). (1809–1858.) Ueber elektrische Differenzen und ueber Faraday's Schwefel-Kalium-Kette. (Ann. Phys. und Chem., Vol. 88, pp. 464–475.) 8vo. *Berlin, 1853*

2975.— —Das Sinus-Elektrometer. (Ann. Phys. und Chem., Vol. 88, pp. 497–519.) 1 plate. 8vo. *Berlin, 1853*

—See also 2964.

2976. **Mathiot,** George. On the electrotyping operations of the U. S. coast survey. (Extracted from the Amer. Journ. Sc. & Arts, Ser. II, Vol. 15.) 15 pp. 1 plate. 8vo. *New Haven, 1853*

History and application of the art of electrotyping.

2977. **Regnauld,** Jules (Antoine). (1820–1895.) Méthode pour la détermination des forces électromotrices. (Comptes rendus, Acad. Sc., Vol. 38, pp. 38–42.) 4to. *Paris, 1853*

Note on a method of comparing the *e. m. f.* of batteries.

—See also 1129.

2978. **Sabine,** (Sir) Edward. (1788–1883.) On the influence of the moon on the magnetic declination at Toronto, St. Helena, and Hobarton. (Philos. Trans. Roy. Soc., 1853, pp. 549–560.) 4to. *London, 1853*

The existence of a lunar diurnal variation in magnetic declination is shown by observations taken at Toronto, St. Helena, and Hobarton.

—See also 2544.

2979. **Wiedemann,** (Gustav Heinrich) (1826–1899) & (Rudolph) Franz **Wiedemann.** Ueber die Waerme-Leitungsfaehigkeit der Metalle. (Ann. Phys. und Chem., Vol. 89, pp. 497–531.) 1 plate. 8vo. *Berlin, 1853*

Heat-conductivity of metals.

—See also 3219.

2980. **Electro-Biology,** Mesmerism and Table-turning. (A review of contemporaneous books.) (Quart. Review, London, Vol. 93, pp. 501–557.) 8vo. *London, 1853*

A mesmeric paper.

2981. **Specimen** printed by the House Printing Telegraph. *1853*

2982. **Billet,** (Felix). (1800–1882.) Description de quelques appareils qui facilitent les expériences de l'électricité dynamique. (Ann. Chim. et Phys., Ser. III, Vol. 42, pp. 168–186.) 1 plate. 8vo. *Paris, 1854*

Some electrodynamic apparatus devised by the author.

—See also 2928.

2983. **Guillemin,** (Claude Marie) (1822–1890) et Emile **Bournouf.** Recherches sur la transmission de l'électricté dans les fils télégraphiques. (Comptes rendus, Acad. Sc., Vol. 39, pp. 330–334.) 4to. *Paris, 1854*

Experiments on the propagation of electricity along telegraph wires.

—See also 3184.

2984. **Lamont,** J(ohann) von. (1805–1879.) Magnetische Karten von Deutschland und Bayern, nach den neuen Bayerischen und

Oesterreichischen Messungen unter Benuetzung einiger aelterer Bestimmungen. iv pp.+16 pp. 6 maps. Folio. *Munich, 1854*

Magnetic survey of Germany and Bavaria with maps and numerical data.
—See also 2803.

2985. **Phillips,** John. (1800–1874.) On magnetic phaenomena in Yorkshire. 21 pp. 8vo. *York, 1854*

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2987. **Thomson,** (Sir) W(illiam). (Lord Kelvin.) (1824–1907.) Account of researches in thermo-electricity. (Proc. Roy. Soc., Vol. 7, pp. 49–58.) 8vo. *London, 1854*

Remarks on the specific heat of electricity.
—See also 2946.

2988. **Tyndall,** John. (1820–1893.) On the vibrations and tones produced by the contact of bodies having different temperatures. (Philos. Trans. Roy. Soc., 1854, pp. 1–10.) 4to. *London, 1854*

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—See also 2950.

2989. **Verdet,** (Marcel Emile). (1824–1866.) Recherches sur les propriétés optiques développées dans les corps transparents par l'action du magnétisme. (Ann. Chim. et Phys., Ser. III, Vol. 41, pp. 370–412.) 1 plate. 8vo. *Paris, 1854*

Note on the relation between the rotation of the plane of polarization and wave length employed.
—See also 2925.

2990. (**Wynter,** Andrew.) The electric telegraph. (Quarterly Review, Vol. 95, pp. 119–164.) 8vo. *London, 1854*

Review of telegraphic discovery and enterprise; frequent references to Cooke and Wheatstone.

2991. **Telegraphie.**. (Didaskalia, Sept. 2, 1854.) 4to. *Frankfort, 1854*

Series of articles on the history and development of the electric telegraph and telephone; proposed telegraphic communication with America.

2992. **The electric telegraph.** (A review of the works of F. C. Bakewell, Edward Highton, Charles Mayburg, Alexander Jones, Lawrence Turnbull, Abbé Moigno and Joseph Whitworth.) (Quarterly Review, Vol. 95, pp. 119–164.) 8vo. *London, 1854*

2993. **Airy,** (Sir) G(eorge) B(iddell). (1801–1892.) On the difference of the longitude between the observatories of Brussels and Greenwich, as determined by galvanic signals. (Mem. Roy. Astronom. Soc., Vol. 24, pp. 1–28.) 4to. *London, 1855*

This volume also contains an account of the electric and chronographic apparatus of the Greenwich observatory, as also the determination of the longitude of Valencia, Ireland.
—See also 2750.

2994. **Baxter,** H(enry) F(orster). An experimental inquiry undertaken with the view of ascertaining whether any force is evolved during muscular contraction analogous to the force evolved in the fish, gymnotus, and torpedo. (Proc. Roy. Soc., Vol. 7, pp. 378–379.) 8vo. *London, 1855*

During muscular contraction, an electric current is produced.

—See also 2955.

2995. **Brewster,** (Sir) David. (1781–1868.) Electricity. (Edinburgh Encyclopaedia, pp. 441–550.) 8 plates. 4to. *Edinburgh, (1855)*

Static electricity: descriptive, practical and theoretical.

2996.— —Electricity. (Encyclopaedia Britannica, New edition, pp. 523–627.) 9 plates. 4to. *London, 1855*

Extensive treatise historical, theoretical and experimental. Newton's glass-globe machine; Gordon's glass-cylinder; Watson coats the inside and outside of Leyden jar with tinfoil, Dr. Bevis coats pane of glass on both sides; Franklin's kite, June, 1752; Ronalds' electroscope and electric telegraph.

—See also 1197.

2997. **Callan,** N(icholas) J. On a new single fluid galvanic battery, more powerful, and less expensive in construction and use than any of the nitric acid batteries. (Philos. Mag. Ser. IV, Vol. 9, pp. 260–272.) 8vo. *London, 1855*

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—See also 2859.

2998. **Faraday,** Michael. (1791–1867.) Experimental researches in electricity. Thirtieth series. 38. Constancy of differential magnecrystallic force in different media. 39. Action of heat on magnecrystals. 40. Effect of heat upon the absolute magnetic force of bodies. (Abstract of the paper published in the Philos. Trans. Roy. Soc.) (Proc. Roy. Soc., Vol. 7, pp. 524–526.) 8vo. *London, 1855*

Abstract of papers on magne-crystallic force.

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—See also 2549.

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The method consisted in connecting Leyden jars or other condensers with the secondary of an induction coil.

—See also 2802.

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Analogy between magnetic and ordinary molecular actions.

—See also 2918.

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Fundamental facts in electrolysis; theory of the tangent galvanometer.
—See also 2964.

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The magnetic elements of various places on the coast of the Adriatic Sea, 1854.
—See also 1235.

3004. **Lloyd,** Humphrey. (1800–1881.) Results of observations made at the Magnetical Observatory of Dublin, 1840–1843. I. Series: Magnetic declination. (Trans. Irish Acad., Vol. 22, pp. 74–96.) 3 plates. 4to. *Dublin, 1855*
The observations were made every alternate hour night and day; discussion of disturbances; charts showing the daily and yearly variation. (Autograph copy.)
—See also 2726.

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Some statistics of lightning fatalities.
—See also 1370.

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The forces of nature are held to be different manifestations of one and the same entity. (Autograph copy.)
—See also 1004.

3007. **Schlagintweit,** Adolph, Hermann (Rudolph Alfred) **Schlagintweit** (1826–1882) & Robert **Schlagintweit.** Reports on the Proceedings of the Officers engaged in the Magnetic Survey in India. Reports. I to X. 25+56+64+15+15+7 pp. 8vo. *Madras, Calcutta, Lahore, Agra, 1855–1857*
—See also 3146.

3008. **Thomson,** (Sir) William. (Lord Kelvin.) (1824–1907.) On the theory of the electric telegraph. (Proc. Roy. Soc., Vol. 7, pp. 382–399.) 8vo. *London, 1855*
Formula for the capacity of a cable.
—See also 2946.

3009. **Tyndall,** John. (1820–1893.) On the existence of a magnetic medium in space. (Letter addressed to Mr. (Michael) Faraday.) (Philos. Mag. Ser. IV, Vol. 9, pp. 205–209.) 8vo. *London, 1855*
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The excitement of diamagnetic bodies when placed in a magnetic field held to be of a dual nature; important contribution to the phenomena and theory of diamagnetism.

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3010b.——(The same paper.) (Proc. Roy. Soc., Vol. 7, pp. 214–218.) 8vo. *London, 1855*

3011.——The polymagnet. (Philos. Mag., Ser. IV, Vol. 9, pp. 425–430.) 1 plate. 8vo. *London, 1855*
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—See also 2950.

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The conclusion reached is "that whatever the length of the wire attached to the insulated pole of a battery, it becomes charged to the same degree of tension throughout."

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—See also 2585.

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The discussion of the mathematical principles as well as of the observations is followed by a number of practical inferences and suggestions.
—See also 2750.

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—See also 2931.

3021. **(Field,** Cyrus West). (1819–1892.) Statement of some of the advantages attendant upon making St. John's, Newfoundland, a port of call for Transatlantic steamers. 12 pp. 1 map. 8vo. *London, 1856*
List of 25 soundings in the Atlantic with remarks (in pencil), on the nature of the ocean floor (1856). Map of projected cable route. (See No. 3090.)
—See also 1389, 3090, 4007, 4393, 4580, 5358, 5408.

3022. **Gore,** G(eorge). On the electrical relations of lead and antimony in various conducting liquids. (Pharmac. Journ., Vol. 15, pp. 413–415.) *8vo. *London, 1856*
Lead more electro-positive than antimony in conducting liquids generally.
—See also 1357, 3131, 3181, 3235, 3294, 3347, 3397, 3580, 3638, 3664, 3690, 3723, 3755, 3822, 3939, 4011, 4080, 4125, 4227, 4265, 4305, 4315, 4324, 4343, 4355.

3023. **Gros,** (Jean B. Louis). Lettre sur la télégraphie électrique. 31 pp. 18 plates. 8vo. *Paris, 1856*
Simple popular explanation of the transmission of electric signals.

3023a.——(German translation.) Anschauliche Darstellung der elektrischen Telegraphie zur Verstaendlichung des grossen Publicums. In einem Briefe an eine Dame. Nach dem Franzoesischen. 38 pp. 18 plates. 8vo. *Weimar, 1857*

3024. **Grove,** (Sir) W(illiam) R(obert). (1811–1896.) Inferences from the negation of perpetual motion. (Proc. Roy. Instit., Great Britain, Vol. 2, pp. 152–159.) 8vo. *London, 1856*
"The recent progress of science is continually tending to get rid of occult qualities or latent entities," p. 8.
—See also 2802.

3025. **Harris,** (Sir) William Snow. (1792–1867.) On a general law of electrical discharge. (Philos. Mag., Ser. IV, Vol. 11, pp. 339–360.) 1 plate. 8vo. *London, 1856*
The author's "thermo-electrometer," p. 6.

3026.——On certain phaenomena of electrical discharge. (Philos. Mag., Ser. IV, Vol. 12, pp. 136–140.) 8vo. *London, 1856*
Remarks on the author's "unit jar."

3027.——On quantitative measurement in statical electricity and on some new phenomena of electrical force. (Proc. Roy. Soc., Vol. 8, pp. 166–171.) 8vo. *London, 1856*
Remarks on Coulomb's law.
—See also 2556.

3028. **Hearder**, Jonathan, N(ash). (1809–1876.) On a powerful form of the induction coil, with some new statical and thermal effects of the induced current. (Philos. Mag., Ser. IV, Vol. 12, pp. 377–386.) 8vo. *London, 1856*

Leyden batteries charged by inductive effect of distant electric storm, p. 9.

3029.— —On a new arrangement of the induction coil. (Philos. Mag., Ser. IV, Vol. 12, pp. 443–445.) 8vo. *London, 1856*

Note on effects obtained from the author's induction coil with description of apparatus.

—See also 2916.

3030. **Mahmoud-Effendi.** Etat actuel des éléments du magnétisme terrestre à Paris et dans ses environs. (Comptes rendus, Acad. Sc., Vol. 42, pp. 905–909.) 4to. *Paris, 1856*

Variation of magnetic dip with distance from Paris.

3031.— —Mémoire sur l'état actuel des lignes isocliniques et isodynamiques dans la Grande-Bretagne, la Hollande, la Belgique et la France. (Mém. Couronn. et Mém. Sav. Etrang. Acad. Sc. Bruxelles, Vol. 29, pp. 1–47.) 1 map. 4to. *Brussels, 1856*

The dip was determined at 45 stations; the total force at 22. Kaemitz's method for determining the dip is given on p. 9.

3032. **Masarnau**, Vicente Santiago, Manuel **Rioz y Pedraya** & Pedro **Miranda.** Informe de la Real Academia de Ciencias sobre telegrafia electrica. (Mem. Real Acad. Ciencias, Madrid, Vol. 3, pp. 93–184.) 5 plates. 4to. *Madrid, 1856*

The telegraphs of Morse, Bain and Breguet.

3033. **Matthiessen**, A(ugustus). (1831–1870.) Preliminary notice on the electric conducting power of the alkaline metals. (Philos. Mag., Ser. IV, Vol. 12, p. 199.) 8vo. *London, 1856*

Note on the conductivity of sodium and lithium.

3033a.— —On the electric conducting power of the metals of the alkalies and alkaline earths. (Philos. Mag., Ser. IV, Vol. 12, pp. 81–90.) 1 plate. 8vo. *London, 1857*

Conductivity of lithium, potassium, and sodium.

—See also 1685, 3102, 3194, 3245, 3305, 3353, 3378, 3404, 3427, 3462, 3486, 3510, 3573.

3034. **Maxwell**, James Clerk. (1831–1879.) On Faraday's lines of force. (Cambridge Philos. Soc., Vol. 10, pp. 3–59.) 4to. *Cambridge, 1856*

Nature and properties of *lines of force.*

—See also 1872, 3247, 3308, 3427, 3463, 3486, 3512, 3552, 3573, 3587, 3669, 3731, 3770, 3881, 3955.

3035. **Quincke**, G(eorg Hermann). Ueber die Verbreitung eines elektrischen Stromes in Metallplatten. (Ann. Phys. und Chem., Vol. 97, pp. 382–396.) 1 plate. 8vo. *Berlin, 1856*

Current stream-lines in plane conductors.

—See also 3200.

3036. **Sabine,** (Sir) Edward. (1788–1883.) On the lunar-diurnal magnetic variation at Toronto. (Philos. Trans. Roy. Soc., 1856, pp. 499–506.) 1 plate. 4to. *London, 1856*
The magnetic action of the moon recognized; the present investigation refers to the moon's diurnal influence on both components of the earth's magnetic force.
—See also 2544.

3037. **Stephenson,** (Sir) Rowland Macdonald. The world's highway. (From the Calcutta Review, March 1856.) 35 pp. 1 map. 8vo. *Serampore, 1856*
The overland route to India.

3038. **Thomson,** (Sir) W(illiam) (Lord Kelvin). (1824–1907.) On the electro-dynamic qualities of metals. (Philos. Trans. Roy. Soc., 1856, pp. 649–751.) ill. 1 plate. 4to. *London, 1856*
Memorable paper on thermo-electric phenomena: electric conduction of heat; thermo-electric inversion; effect of magnetization on electric conductivity.

3039.——On the origin and transformations of motive power. (Proc. Roy. Instit., Great Britain, Vol. 2, pp. 199–204.) 8vo. *London, 1856*
Available sources of energy traced to solar heat and the rotation of the earth.

3040.——On practical methods for rapid signalling by the electric telegraph. (Proc. Roy. Soc., Vol. 8, pp. 299–307.) 8vo. *London, 1856*
Mirror galvanometer proposed as a receiver for telegraph messages.
—See also 2946.

3041. **Tyndall,** John. (1820–1893.) On the relation of diamagnetic polarity to magnecrystallic action. (Philos. Mag., Ser. IV, Vol. 11, pp. 125–137.) 8vo. *London, 1856*
One of the author's remarkable researches. (Autograph copy, dedicated to Prof. Buff.)

3042.——Further researches on the polarity of the diamagnetic force. (Philos. Trans. Roy. Soc., 1856, pp. 237–259.) 4to. *London, 1856*
This remarkable paper concludes with the following affirmation: "Thus have we seen the objections raised against diamagnetic polarity fall away one by one, and a body of evidence accumulated in its favor, which places it among the most firmly established truths of science;" Faraday did not think so.

3042a.——(The same paper.) (Philos. Mag., Ser. IV, Vol. 12, pp. 161–184.) 8vo. *London, 1856*
—See also 2950.

3043. **White,** William. Swedenborg, his life and writings. (Reprinted from the Phonetic Journ.) vii+156 pp. 12mo. *London, 1856*
Scientific work of the Swedish theosophist is appraised in Chapter IV.

3044. **Application** of the theory of the conduction of electricity through solids, etc. 16 pp. 8vo. (*London, 1856?*)
Retardation of signals in submarine cables and underground wires.

3045. **Le phénomène** de la stratification en général. 6 pp. 4to. (MS.) *1856*
On the striated discharge in vacuum tubes.

3046. **Opinions** of the press on the European and Indian Junction Telegraph. 8 pp. 8vo. *1856*
The proposed telegraph line was to connect the Persian Gulf cable with Aleppo and Seleucia.

3047. **(Airy,** (Sir) George Biddell.) (1801–1892.) Description of the galvanic chronographic apparatus. (Greenwich Observations, 1856, Appendix.) 21 pp. 1 plate. 4to. *London, 1857*
The description is accompanied by a MS. letter to Latimer Clark from George Biddell Airy, Director of the Observatory.
—See also 2750.

3048. **Baumgartner,** A(ndreas) von. (1793–1865.) Ueber Gewitter ueberhaupt, Hagelwetter insbesondere. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 23, pp. 277–302.) 8vo. *Vienna, 1857*
Storms in general with special reference to hail-storms.
—See also 1347.

3049. **Belli,** G(iuseppe). (1791–1860.) Sulla possibilita di contrarie correnti elettriche simultanee in uno stesso filo conduttore; memoria seconda. (Nuovo Cimento, Vol. 6, pp. 81–123.) 1 plate. 8vo. *Pisa, 1857*
Explanation of certain current phenomena according to the one-fluid theory.
—See also 864, 3079.

3050. **Blakely,** (Captain). The submerging of electric telegraph cables. (From a report to the Minister of War (?), pp. 10–12.) ill. Folio. *London, 1857*
Rate of sinking of light and heavy cables.

3050a.——(The same paper.) (A report extract from paper read before the British Association.) *London, 1857*
(Autograph copy.)

3051. **Bodie,** James. Observations on laying telegraphic cables in the deep sea. 9 pp. 1 plate. 12mo. *Devonport, 1857*
The author was on board the *Agamemnon* when laying the Atlantic cable. Note on the specific gravity of the cable.

3052. **Bosscha,** J(ohannes, jr.) Ueber mechanische Theorie der Elektrolyse. (Ann. Phys. und Chem., Vol. 101, pp. 517–549.) 8vo. *Berlin, 1857*
The dynamical theory of electrolysis.
—See also 1276.

3053. **Brett,** John Watkins. (1805–1863.) On the submarine telegraph. (Proc. Roy. Instit., Great Britain, Vol. 2, pp. 394–402.) 8vo. *London, 1857*
Narrative of cable enterprises with which the author was connected.
—See also 1411, 4559.

3054. **Brooke,** J. M. On ocean telegraphs. (From a report to the British Minister of War (?), pp. 7–9.) Folio. *London, 1857*
The possibility of laying an ocean cable.

3055. **Clausius,** R(udolph Julius Emmanuel). (1822–1888.) Ueber die Elektricitaetsleitung in Elektrolyden. (Ann. Phys. und Chem., Vol. 101, pp. 338–360.) 8vo. *Berlin, 1857*
Remarks on the theory of Grotthus tending to bring it into harmony with the modern ideas of energy.
—See also 2959.

3056. **Eastern** Counties Railway. Rules and regulations, September 12, 1854. 187 pp. 16mo. *Stratford, 1857*
—See also 4402.

3057. **Ghijben,** J(acob) Badon. (1798–1870.) Over de bepaling spherische aberratie der linzen. (Verslag, Acad. Wetensch., Vol. 6, pp. 271–282.) 8vo. *Amsterdam, 1857*
Spherical aberration of lenses mathematically treated.

3058. **Harris,** (Sir) William Snow. (1792–1867.) Researches in statical electricity. (Philos. Mag., Ser. IV, Vol. 14, pp. 81–100+176–183.) 1 plate. 8vo. *London, 1857*
Theory of the proof-plane; distribution of electricity on conductors, surface density, etc.

3059.— —On some special laws of electrical force. (Philos. Mag., Ser. IV, Vol. 14, pp. 156–159.) 8vo. *London, 1857*
Law of the development of heat by Leyden battery discharges.

3059a.— —Further inquiries concerning the laws and operation of electrical force. (Philos. Mag., Ser. IV, Vol. 29, pp. 65–75.) 8vo. *London, 1865*
Definite meaning of certain electrical terms e. g., *quantity, charge* and *intensity.*

3060.— —On some recent instances of ships and buildings struck by lightning. (Reprinted from the Nautical Mag., 1857.) 9 pp. 8vo. *London, (1857?)*
Accounts of violent electric storms.
—See also 2556.

3061. **Hearder,** Jonathan N(ash). (1809–1876.) On some new statical and thermal effects of the induction coil, with a new instrument for registering a rapid succession of electrical discharges. 14 pp. 8vo. *Plymouth, 1857*
Experiments showing the heating effect of induction coil discharges.
—See also 2916.

3062. **Highton,** Edward. Consideration of the probability of the success of the Atlantic Cable. 2 l. Folio. *London, 1857*
"My opinion is that it is possible that the present (1857) Atlantic Telegraph Cable may be submerged successfully, but that is by no means probable."
—See also 1098, 4540, 5009.

3063. **Joule,** J(ames) P(rescott). (1818–1889.) On the thermo-electricity of ferruginous metals, and on the thermal effects of stretching solid bodies. (Proc. Roy. Soc., Vol. 8, pp. 355–356.) 8vo. *London, 1857*
Contraction of stretched india-rubber when heated.
—See also 2918.

3064. **Lamy,** (Claude Auguste). (1820–1878.) On the magnetism and electrical conductibility of potassium and sodium. (Philos. Mag., Ser. IV, Vol. 13, pp. 148–149.) 8vo. *London, 1857*

3065. **Magnus,** (Heinrich) G(ustav). (1802–1870.) Elektrolytische Untersuchungen. (Ann. Phys. und Chem., Vol. 102, pp. 1–54.) 8vo. *London, 1857*

Some general phenomena of electrolytic deposition with special reference to Prof. Daniell's researches.

—See also 1210, 3101, 3239, 3351.

3066. **Malone,** Thomas A. On the application of light and electricity to the production of engravings—Photogalvanography. (Proc. Roy. Instit., Great Britain, Vol. 2, pp. 343–350.) 8vo. *London, 1857*

Three methods are briefly described in which light was used to aid the art of the engraver.

—See also 3403.

3067. **Matteucci,** C(arlo). (1811–1868.) Electro-physiological researches: Tenth series, Part I. Physical and chemical phenomena of muscular contraction. (Philos. Trans. Roy. Soc., 1857, pp. 129–143.) 4to. *London, 1857*

Development of heat and electricity by the muscle when in the act of contracting.

3067a.——(The same paper.) Abstract. (Proc. Roy. Soc., Vol. 8, pp. 209–211.) 8vo. *London, 1857*

—See also 2728.

3068. **Sabine,** (Sir) Edward. (1788–1883.) On the evidence of the existence of the decennial inequality in the solar-diurnal magnetic variations, and its non-existence in the lunar-diurnal variation of the declination at Hobarton. (Philos. Trans. Roy. Soc., 1857, pp. 1–8.) 1 plate. 4to. *London, 1857*

The observations taken at Toronto and at Hobarton show the existence of a decennial period in the magnetic variation in the case of the sun but not in the case of the moon.

3069.——On hourly observations of the magnetic declination made by Captain Rochfort Maguire, R. N., and the officers of H. M. S. *Plover;* in 1852, 1853 and 1854, at Point Barrow, on the shores of the Polar Sea. (Philos. Trans. Roy. Soc., 1857, pp. 497–532.) 4to. *London, 1857*

The hourly observations at Point Barrow were made in 1852, 1853, 1854. The results are compared with those made at Toronto.

—See also 2544.

3070. **Thomson,** (Sir) William (Lord Kelvin). (1824–1907.) On peristaltic induction of electric currents. (Philos. Mag., Ser. IV, Vol. 13, pp. 135–145.) 8vo. *London, 1857*

The author introduced the term *peristaltic* to characterize the kind of induction by which currents are excited in elongated conductors through variation of electrostatic potential in surrounding matter.

3070a.——(The same paper.) Abstract. (Proc. Roy. Soc., Vol. 8, pp. 121–132.) 8vo. *London, 1857*

3071.——On the electric conductivity of commercial copper of various kinds. (Proc. Roy. Soc., Vol. 8, pp. 550–555.) 8vo. *London, 1857*

Some conditions that influence electric conductivity.
—See also 2946.

3072. **Tyndall,** John. (1820–1893.) On the sounds produced by the combustion of gases in tubes (Philos. Mag., Ser. IV, Vol. 13, pp. 473–479.) 8vo. *London, 1857*

The cause assigned is the explosion produced by the periodic combination of atmospheric oxygen with the jet of hydrogen gas.
—See also 2950.

3073. **Window,** (Frederick Richard). On submarine electric telegraphs. (Proc. Instit. Civil Engin., Vol. 16, pp. 188-202.) 8vo. *London, 1857*

Discussion which followed the reading of the paper.
—See also 1307, 3113.

3074. **Atlantic** telegraph cable. (Nautical Mag., Vol. 26, pp. 439–445.) 8vo. *London, 1857*

Generalities concerning the Atlantic cable of 1857.

3075. **The Leviathan;** a description of Mr. Scott Russell's great ship, built at Millwall, for the Eastern Steam Navigation Company. 15 pp. ill. pl. 12mo. *London, (1857)*

3076. **Treatise** on electricity in theory and practice by Auguste (Arthur) De la Rive. Translated by Charles V(incent) Walker. (pp. 26–62.) 8vo. *London, 1857*

A review of the translation. (See No. 1251.)

3077. **Airy,** (Sir) G(eorge) B(iddell). (1801–1892.) The Atlantic cable problem. (Nautical Mag., Vol. 27, pp. 265–269.) 8vo. *London, 1858*

Form assumed by descending submarine cable; tension at various points; speed of delivery.

3078.——On the mechanical conditions of the deposit of a submarine cable. (Philos. Mag., Ser. IV, Vol. 16, pp. 1–18.) 8vo. *London, 1858*

Mathematical paper on the submergence of a cable.
—See also 2750.

3079. **Belli,** G(iuseppe). (1791–1860.) Sulle induzione elettrostatiche. (Nuovo Cimento, Vol. 7, pp. 97–110.) 1 plate. 8vo. *Pisa, 1858*

Criticism of some contemporary views on electrostatic induction.
—See also 3049.

3080. **Branville,** P. de. Description du systême de télégraphie sous-marine de M. P.-A. Balestrini. (Extract, Mém. Soc. Ingén. Civils.) 8 pp. 8vo. *Paris, 1858*

Note on Balestrini's cable.

3081.— —Mémoire sur la pose des cables sous-marins et sur les opérations préliminaires qui s'y rattachent. (Extract, Mém. Soc. Ingén. Civils.) 32 pp. ill. 8vo. *Paris, 1858*

General considerations on the construction and submergence of a cable; sounding apparatus.

3082. **Cocker,** James. Tabular decimal scale of proposed new sizes for wire, showing the irregular graduation of the old system of gauging. 12 pp. 8vo. *Liverpool, 1858*

3083. **Crace-Calvert,** F(rederick) (1819–1873) & Richard **Johnson** (1810?–1881). On the relative power of metals and alloys to conduct heat. (Philos. Trans. Roy. Soc., 1858, pp. 349–368.) 1 plate. 4to. *London, 1858*

Detailed tabulated record of the conductivity of metals.
—See also 3124, 3125.

3084. **Crace-Calvert,** F(rederick) (1819–1873), Richard **Johnson** (1810?–1881) & G. Cliff **Lowe.** On the expansion of metals and alloys. (Reprinted from the Mechanics' Mag.) 7 pp. pl. 8vo. *London, 1858.*

Description of apparatus; results obtained.
—See also 3083.

3085. **De la Rive,** (Auguste Arthur). (1801–1873.) Shepherd's electric clocks. (Arch. Electr., Vol. 3.) 5 pp. ill. 8vo. *Paris, 1858*

The electric clock of the Royal Observatory, Greenwich.
—See also 2627.

3086. **Ermerins,** J(an) W(illem). (1798–1869.) Over de identiteit van licht en stralende warmte. (Verslag, Akad. Wetensch., Vol. 7, pp. 81–99.) 8vo. *Amsterdam, 1858*

Identity of light and radiant heat.

3087. **F....** J. Electro-motor machines. (Journ. Soc. Arts, Vol. 6, p. 313.) 4to. *London, 1858*

3088. **Fabbri,** R(uggiero). Microscopic observations on the electric spark. (Philos. Mag., Ser. IV, Vol. 16, pp. 77–78.) 8vo. *London, 1858*

3089. **Faraday,** Michael. (1791–1867.) On Wheatstone's electric telegraph in relation to science. (Proc. Roy. Instit., Great Britain, Vol. 2, pp. 555–560.) 8vo. *London, 1858*

—See also 2549.

3090. **Field,** Cyrus W(est). (1819–1892.) Remarks of Cyrus W. Field, at St. John's Newfoundland and New York, after the laying of the Atlantic Telegraph Cable in 1858. 2 l. 4to. *London, 1858*

—See also 3021.

3091. **Gassiot,** John P(eter). (1797–1877.) The Bakerian lecture. On the stratifications and dark band in electrical discharges

as observed in Torricellian vacua. (Philos. Trans. Roy. Soc., 1858, pp. 1–16.) 1 plate. 4to. *London, 1858*

Account of experimental inquiry into the nature of the electric discharge in rarefied media.

3091a.——On the stratifications in electrical discharges as observed in Torricellian and other vacua. Second communication. (Philos. Trans. Roy. Soc., 1859, pp. 137–160.) 1 plate. 4to. *London, 1859*

Experimental study of the discharge from both terminals of a "vacuum" tube.

—See also 2819.

3092. **Gravatt,** William. (1806–1866.) On the Atlantic Cable. (Philos Mag., Ser. IV, Vol. 16, pp. 34–37.) 8vo. *London, 1858*

Strain on a submarine cable during the process of laying.

3093. **Grove,** (Sir) William R(obert). (1811–1896.) On the striae seen in the electrical discharge in vacuo. (Philos. Mag., Ser. IV, Vol. 16, pp. 18–22.) 8vo. *London, 1858*

—See also 2802.

3094. **(Harris,** (Sir) William Snow.) (1792–1867.) Destructive agency of lightning. I. Gunpowder explosions by lightning.—II. Sacred edifices and other important public buildings burned or partially destroyed by lightning.—III. Remarkable instances in which ships and vessels of various kinds have been burned and otherwise destroyed by the electrical discharge. (Extracts from the Nautical Mag., Vol. 27.) 2+2+3 pp. 8vo. *London, 1858*

3095.——H. M. S. *Shannon* struck by lightning. (Reprinted from the Nautical Mag., Vol. 27.) 2 pp. 8vo. *London, 1858*

Ship struck three times and saved by her lightning conductors.

—See also 2556.

3096. **Hearder,** Jonathan N(ash). (1809–1876.) On the difference in the amount of electricity developed by equal surfaces of cylinder and plate electrical machines. (Philos. Mag., Ser. IV, Vol. 15, pp. 290–299.) 8vo. *London, 1858*

Study of the action and efficiency of each part of frictional machines.

—See also 2916.

3097. **Hood,** R. Jacob. On the construction and arrangement of railway stations. (Instit. Civil. Engin., Proc., Paper 1857–1858 No. 19.) 14 pp. 8vo. *London, 1858*

In the discussion, Prof. Airy made a brief communication on submerging telegraph cables.

3098. **Laming,** Richard. A challenge in a letter on electrical education, addressed to H. R. H., the Prince Consort. 7 pp. 8vo. *London, 1858*

The author thinks his theory "competent to carry Professor Faraday at once to a proper understanding of that polarization which his practical sagacity long ago detected around him, but could not comprehend."

—See also 961.

3099. **Lloyd,** H(umphrey). (1800–1881.) On the direct magnetic influence of our distance luminary upon the diurnal variations of the magnetic force at the earth's surface. (Philos. Mag., Ser. IV, Vol. 15, pp. 192–196.) 8vo. *London, 1858*

The diurnal variation of the magnetic elements not caused by the direct magnetic action of the sun or moon.
—See also *2726.*

3100. **Loomis,** Elias. (1811–1889.) On the electrical phenomena observed in certain houses in New York. (Amer. Journ. Sc. & Arts, Ser. II, Vol. 26, pp. 58–64.) 8vo. *New Haven, 1858*

Electrification due to walking briskly across a room; velvet carpet best of all.
—See also *2866.*

3101. **Magnus,** (Heinrich) G(ustav). (1802–1870.) Ueber directe und indirecte Zersetzung durch den galvanischen Strom. (Ann. Phys. und Chem., Vol. 104, pp. 553–580.) 8vo. *Leipzig, 1858*

Electrolytic decomposition.
—See also *3065.*

3102. **Matthiessen,** Augustus. (1831–1870.) On the thermo-electric series. (Philos. Trans. Roy. Soc., 1858, pp. 369–387.) ill. 4to. *London, 1858*

Determination of the places in the thermoelectric series of the metals of the alkalies and alkaline earths together with most other metals and some alloys.
—See also *3033.*

3103. **Nolloth,** M. S. On the submergence of the Atlantic telegraph cable. (From the Journ. United Service Instit., Vol. 11.) 15 pp. 8vo. *London, (1858?)*

Suggestions by the author on the submergence of cables; also criticism of some proposed schemes.

3104. **Pluecker,** Julius. (1801–1868.) On the magnetic induction of crystals. (Philos. Trans. Roy. Soc., 1858, pp. 543–587.) 1 plate. 4to. *London, 1858*

Mathematical and experimental paper.
—See also *2888.*

3105. **Sabine,** (Sir) Edward. (1788–1883.) On hourly observations of the magnetic declination, made by Captain Rochfort Maguire, R. N., in 1852, 1853, 1854, at Point Barrow, on the shores of the Polar Sea. (Philos. Mag., Ser. IV, Vol. 16, pp. 51–54.) 8vo. *London, 1858*

3106.——Remarks upon the magnetic observations transmitted from York Fort in Hudson's Bay, in August 1857, by Lieut. Blakiston. (Proc. Roy. Soc., Vol. 9, pp. 81–91.) 8vo. *London, 1858*

Magnetic forces in the Hudson Bay region.
—See also *2544.*

3107. **Siemens,** (Sir) Charles William. (1822–1883.) On the progress of the electric telegraph. (Journ. Soc. Arts, Vol. 6, pp. 348–358.) 4to. *London, 1858*

Address on the origin and growth of the electric telegraph; Oersted said to have been anticipated by Romagnosi of Trent, 1802.

—See also 1654, 3207, 3257, 3317, 3367, 3427, 3486, 3517, 3562, 3573, 3703, 3741, 3762, 3770, 3796, 3844, 4036, 4102, 4194, 4243, 5017, 5053, 5057, 5378, 5401, 5411.

3108. **Thomson,** (Sir) W(illiam) (Lord Kelvin). (1824–1907.) Dynamical illustrations of the magnetic and helicoidal rotatory effects of transparent bodies on polarized light. (Proc. Roy. Soc., Vol. 8, pp. 150–158.) 8vo. *London, 1858*

Effect of a magnetic field on the plane of polarization.

—See also 2946.

3109. **Varley,** Samuel Alfred. On the electrical qualifications requisite in long submarine telegraph cables. (Proc. Instit. Civil Engin., Vol. 17, pp. 149–166.) 8vo. *London, 1858*

Criticism on the construction of the Atlantic cable of 1858; cable and Leyden jar compared.

—See also 3154, 4364.

3110. **Walker** and **Wolfe.** Reports on Valencia Harbour, a western packet station. 55 pp. 1 map. 8vo. *London, 1858*

Valencia and Galway as Atlantic steamship stations.

3111. **Webb,** Frederick Charles. (1828–1899.) On the practical operations connected with paying out and repairing submarine telegraph cables. (Proc. Instit. Civil Engin., Vol. 17, pp. 262–297.) 1 plate. 8vo. *London, 1858*

Paper based on the author's experience in laying and repairing deep-sea cables, followed by a lengthy discussion.

3111a.— —(The same paper.) Abstract. (Newton's Lond. Journ. Arts, 1858, pp. 225–232.) 8vo. *London, 1858*

—See also 1562, 3218, 3568, 3593, 3708, 3768, 3976, 4205, 5205, 5466.

3112. **Whitworth,** (Sir) J(oseph). (1803–1887). On standard decimal measures of length for mechanical engineering work. (Proc. Instit. Mech. Engin., 1857, pp. 134–141.) 8vo. *Birmingham, 1858*

—See also 4157, 5490.

3113. **Window,** F(rederick Richard). Submarine electric telegraphs. (Excerpt, Minutes, Proc. Instit. Civil Engin.) (New Quart. Review, 1858, pp. 158–164.) 4to. *London, 1858*

Some points in the history of ocean telegraphic enterprise.

—See also 3073.

3114. **Committee** appointed to obtain information about gutta percha. (Journ. Soc. Arts, Vol. 6, p. 334.) 8vo. *London, 1858*

Among the members of the committee were: Latimer Clark, C. W. Siemens, Prof. E. Solly.

3115. **History** of the magnetic telegraph. (Bankers' Mag., Vol. 12, pp. 889–898.) 8vo. *New York, 1858*

List of cables in operation.

3116. **The Atlantic** cable. (Nautical Mag., Vol. 27, pp. 225–265.) 8vo. *London, 1858*

Discussion of the engineer's report, cable of 1857.

3117. **The Atlantic** telegraph. (North British Review, Vol. 29, pp. 519–555.) 8vo. *Edinburgh, 1858*

General article on the origin and progress of submarine cable in the Hoogley river. See p. 520.

3118. **Becquerel,** A(lexandre) E(dmond). (1820–1891.) On the phosphorescence of gases by the action of electricity. (Philos. Mag., Ser. IV, Vol. 18, pp. 383–384.) 8vo. *London, 1859*

—See also 2927.

3119. **Becquerel,** (Antoine César). (1788–1878.) Recherches sur les causes de l'électricité atmosphérique et terrestre. (Mém. Acad. Sc., Vol. 27, pp. 153–294.) 2 plates. 4to. *Paris, 1859*

Résumé of the causes of atmospheric electricity, p. 261.

—See also 2564.

3120. **Buff,** (Heinrich). (1805–1878.) On the law of electrolytic conduction. (Philos. Mag., Ser. IV. Vol. 17, pp. 394–396.) 8vo. *London, 1859*

"Oxide of iron and sulphide of lead, if they could be obtained in a state of fusion and subjected to a current, would conduct only so far as they are decomposed."

—See also 1009.

3121. **Callan,** N(icholas) J. A brief account of an induction coil of great power in proportion to its length. (Philos. Mag., Ser. IV, Vol. 17, pp. 332–334.) 8vo. *London, 1859*

Interesting from the historical point of view; details of the author's coil and battery; iron wire may be used for the secondary. Rev. Dr. Callan was Professor of Natural Philosophy in Maynooth College.

—See also 2859.

3122. **Cayley,** A(rthur). (1821–1895.) An analytical theorem relating to the distribution of electricity on spherical surfaces. (Philos. Mag., Ser. IV, Vol. 18, pp. 119–127.) 8vo. *London, 1859*

Mathematical paper on the distribution of electric charge.

3123. **Challis,** (James). (1803–1882.) A mathematical theory of heat. (Philos. Mag., Ser. IV, Vol. 17, pp. 202–209.) 8vo. *London, 1859*

Light is due to transverse vibrations but heat is held to be the result of "the mechanical action of the direct vibrations."

—See also 3167, 3226, 3338, 3599, 3683.

3124. **Crace-Calvert,** F(rederick). (1819–1873.) Conductibility of mercury and amalgams. (Philos. Trans. Roy. Soc., 1859, pp. 831–835.) 4to. *London, 1859*

Remarkable manner in which heat is conducted by mercury.

—See also 3083, 3125, 3440.

3125. **Crace-Calvert,** F(rederick) (1819–1873) & Richard **Johnson** (1810?–1881). On the specific gravities of alloys. (Philos. Mag., Ser. IV, Vol. 18, pp. 354–359.) 8vo. *London, 1859*
Study of alloys and amalgams; tables of results.
—See also 3083, 3124.

3126. **Dove,** (Heinrich Wilhelm). (1803–1879.) On the difference presented by the prismatic spectrum of the electric light in vacuo at the positive and negative poles. (Philos. Mag. Ser. IV, Vol. 17, pp. 79–80.) 8vo. *London, 1859*
Difference between the positive and the negative carbon in the electric arc.

3127. **Forbes,** J(ames) D(avid). (1809–1868.) Notes on certain vibrations produced by electricity. (Philos. Mag., Ser. IV, Vol. 17, pp. 358–360.) 8vo. *London, 1859*
Remarks on the Trevelyan experiment and on Gore's circular railway and ball. Dynamical actions of current.
—See also 2680.

3128. **Fritsch,** Karl. (1812–1879.) Ueber die Stoerungen des taeglichen Ganges einiger der wichtigsten meteorologischen Elemente an Gewittertagen. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 38, pp. 633–704.) 1 plate. 8vo. *Vienna, 1859*
Various kinds of storms.
—See also 2935.

3129. **Gaugain,** J(ean) M(othée). (1811–1880.) Experiments to show the existence of a new species of resistance to the transmission of electricity. (Philos. Mag., Ser. IV, Vol. 18, pp. 237–239.) 8vo. *London, 1859*
On the conductivity of glass; the author suggests two forms of electric conductibility.
—See also 1940, 3178, 3234, 3291, 3346, 3394, 3544.

3130. **Gherardi,** S(ilvestro). (1802–1879.) Sul coeficiente di compressibilita apparente dell'acqua. (Extract, Rivista Contemporanea.) 11 pp. 8vo. *Turin, 1859*
Brief account of the author's experiments on the compressibility of water.
—See also 894, 3293.

3131. **Gore,** G(eorge). Description of an apparatus for examining the electrical relations of unequally heated mercury and fluid alloys in conducting liquids. (Philos. Mag., Ser. IV, Vol. 17, pp. 398–401.) 1 plate. 8vo. *London, 1859*
—See also 3022.

3131bis. **Grove,** (Sir) William Robert. (1811–1896.) On the electrical discharge, and its stratified appearance in rarefied media. (Proc. Roy. Instit., Great Britain, Vol. 3, pp. 5–10.) 8vo. *London, 1859*
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3132. **Hearder,** J(onathan) N(ash). (1809–1876.) On the Atlantic cable. (Philos. Mag., Ser. IV, Vol. 17, pp. 27–42.) 8vo. *London, 1859*
General phenomena observed in signaling through cables; cause of failure

of first Atlantic cable; batteries and induction coils used on the Atlantic cable of 1858.

3133.——On a new form of telegraph cable intended to reduce the effects of inductive action. (Philos. Mag. Ser. IV, Vol. 17, pp. 334–345.) 8vo. *London, 1859*

Series of experiments made with Leyden jars which seem to justify the author's proposed modifications in the construction of submarine cables.
—See also 2916.

3134. Heath, L. G. Description of a method of coiling submarine telegraph cables whereby the danger of kinking will be avoided. 7 pp. 8vo. *Portsea, 1859*

3135. Henry, Joseph. (1797–1878.) Atmospheric electricity. (Bull. U. S. Dept. Agriculture, 1859, pp. 461–524.) 8vo. *Washington, 1859*

Curious instance of electrostatic influence, p. 477; discussion of atmospheric electricity, forms of lightning conductors. Pamphlet containing extensive and valuable information on the subject of atmospheric electricity.
—See also 2667.

3136. Isaacs. Urinal in Mount Pleasant. (Holborn Journ. 1859.) 8vo. (Newspaper article.) *Holborn, 1859*

The first self-flushing urinal; patented by Latimer Clark.

3137. Jenkin, (Henry Charles Fleeming). (1833–1885.) Abstract of a paper on gutta-percha as an insulator at various temperatures. (Civil Engin. and Archit. Journ., Vol. 22, pp. 321–322.) 4to. *London, 1859*

Experiments to determine the absolute resistance of gutta-percha and the effect of temperature on its insulation resistance.
—See also 1677, 3237, 3265, 3296, 3350, 3378, 3427, 3454, 3464, 3486, 3505, 3573, 3757, 3770, 4162, 4556, 4608, 4706, 4931, 5185, 5356, 5483.

3138. Lovering, J(oseph). On the secular periodicity of the aurora borealis. (Mem. Amer. Acad., Vol. 9, pp. 101–120.) 4to. *Boston, 1859*

List of aurorae.
—See also 3586, 3728.

3139. Mueller, (J. W.) von. Observations on terrestrial magnetism in Mexico. With notes and illustrations of an examination of the Volcano Popocatepetl and its vicinity by August Sonntag. (Smithsonian Contributions to Knowledge.) 84 pp. 1 map. 4to. *Washington, 1859*

Instruments and methods of making the observations; declination, horizontal force and dip.

3140. Nicklès, M. J. On the fixation of the magnetic image. (Philos. Mag., Ser. IV, Vol. 19, p. 164.) 8vo. *London, 1859*

Note on a method of fixing iron filings on paper.

3141. Pluecker, (Julius). (1801–1868.) On the action of the magnet upon the electric current from a new point of view. (Philos. Mag., Ser. IV, Vol. 18, pp. 1–7.) 8vo. *London, 1859*

Account of experiments on rotating currents made by the author.

3142.——On the spectra in highly rarefied gases of different kinds during the passage of the electric discharge. (Philos. Mag., Ser. IV, Vol. 18, pp. 7–20.) 8vo. *London, 1859*
Important contribution to the physics of the vacuum tube.
—See also 2888.

3143. **Quet,** (Jean Antoine) (1810–1884) & (Marc. Ainé) **Seguin.** (1786–1875.) Stratification of the electric light. (Philos. Mag., Ser. IV, Vol. 17, pp. 447–449.) 8vo. *London, 1859*
From the *Comptes rendus,* Febr. 14, 1859.
—See also 1624.

3144. **Robinson,** T(homas) R(omney). (1792–1882.) On stratification of electric light. (Philos. Mag., Ser. IV, Vol. 17, pp. 269–274.) 8vo. *London, 1859*
Callan's sectional induction coil with variable condenser.
—See also 1148, 3313, 3559.

3145. **Sabine,** (Sir) Edward. (1788–1883.) Manual of scientific enquiry. Part IV: Terrestrial magnetism. pp. 86–119. 8vo. *London, 1859*
Article on absolute measurements written for the Admiralty "Manual of Scientific Inquiry," 1859. Description and use of the unifilar magnetometer.
—See also 2544.

3146. **Schlagintweit,** Hermann (Rudolph Alfred) (1826–1882), Adolph **Schlagintweit** & Robert **Schlagintweit.** Ueber magnetische Beobachtungen in Indien und Hochasien. (Gelehrte Anzeigen, Bayer. Akad. Wiss., Vol. 48, pp. 290–302.) 4to. *Munich, 1859*
Magnetic intensity in India.
—See also 3007.

3147. **Secchi,** A(ngelo). (1818–1878.) Sur la variation des éléments magnétiques (Lettre à Ad. Quetelet). (Bull. Acad. Sc., Belgique, Ser. II, Vol. 7, pp. 520–528.) 1 plate. 8vo. *Brussels, 1859*
Description of magnetometers: magnetic elements for Rome, 1859.
—See also 1189, 3417.

3148. **Sédillot,** L(ouis Pierre Eugène Amélie). (1808–1875.) Deuxième lettre à M. de Humboldt sur quelques points de l'histoire de l'astronomie et des mathématiques chez les orientaux. 29 pp. 8vo. *Paris, 1859*
Origin of arithmetical symbols.

3149. **Stewart,** Balfour. (1828–1887.) On some results of the magnetic survey of Scotland in 1857–1858. (Report, British Ass. Adv. Sc., 1859, pp. 167–190.) 1 map. 8vo. *London, 1859*
Tables of the three magnetic elements determined at numerous stations.
—See also 1925, 3208, 3260, 3369, 3427, 3486, 3520, 3573, 4041.

3150. **Thomson,** (Sir) W(illiam) (Lord Kelvin). (1824–1907.) New apparatus for observing atmospheric electricity. (Philos. Mag., Ser. IV, Vol. 17, p. 312.) 8vo. *London, 1859*
The apparatus consisted chiefly of a hollow conductor supported on a glass rod kept dry by sulphuric acid.
—See also 2946.

3151. **Tschudi,** J(ohann) J(acob). (1818–1889.) Ueber einige elektrische Erscheinungen in den Cordilleras der Westkueste Sued-Amerikas. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 37, pp. 575–590.) 8vo. *Vienna, 1859*
Some electrical phenomena observed in the Cordilleras mountains.

3152. **Tyndall,** John. (1820–1893.) On vibrations produced by an electric current. (Philos. Mag., Ser. IV, Vol. 17, pp. 417–419.) 8vo. *London, 1859*
The Trevelyan experiment and the electric current.
—See also 2950.

3153. **Rees,** R(ichart) van. (1797–1875.) Naschrift. Antwood aan den Heer van Breda. (Verslag. Akad. Wetensch., Vol. 9, pp. 307–319.) 8vo. *Amsterdam, 1859*
Construction of the lightning-rod.
—See also 1471.

3154. **Varley,** S(amuel) Alfred. On the practical bearing of the theory of electricity in submarine telegraphy, the electrical difficulties in long circuits and the conditions requisite in a cable to insure rapid and certain communication. (Soc. Jour. Arts, Vol. 7, pp. 302–310.) 4to. *London, 1859*
Retardation of signals in submarine cables.
—See also 3109.

3155. **Volpicelli,** (Paolo). (1804–1879.) On frictional electricity. (Philos. Mag., Ser. IV, Vol. 18, pp. 26–30.) 8vo. *London, 1859*
Some anomalies observed in the development of electricity by rubbing resinous bodies.
—See also 1399, 3216, 3766.

3156. **Walker,** Charles V(incent). (1811–1882.) Platinized graphite batteries. (Philos. Mag., Ser. IV, Vol. 18, pp. 73–77.) 8vo. *London, 1859*
Description of the battery and experiments made with it.
—See also 2811.

3157. **Waterston,** J(ohn) J(ames). Note as to relation of common and voltaic electricity. (Philos. Mag., Ser. IV, Vol. 17, pp. 345–347.) 8vo. *London, 1859*
Remarks on Faraday's statement as to the quantity of electricity required to decompose a grain of water.
—See also 3476, 3523.

3158. **"Londoner."** A telegraph half-way to America; why is it not used? 24 pp. 8vo. *London, 1859*
New mail routes to America.

3159. **Mr. C. V. Walker's** train-signaling system. (Reprinted from De la Rive's Arch. Electr., Genève, Vol. 3.) 8 pp. ill. 8vo. *London, 1859*
Short, illustrated paper.

3160. **The First** Atlantic cable. 1 plate. Sq. folio. *London, (1859?)*
Longitudinal section of the *Agamemnon* and the *Niagara,* which vessels laid the cable of 1858, showing position of the coils of cable with length in nautical miles.

3162. **(Adley,** Charles Coles.) The telegraph in India. (Reprinted from the Engineer's Journ., Vol. 3.) 11 pp. 8vo. *Calcutta, 1860*

"The telegraph in India is a failure," p. 11.
—See also 1274, 4401, 4558, 4563, 5172.

3163. **Andrews,** Thomas (1813–1885) & P(eter) G(uthrie) **Tait** (1831–1900.) On the volumetric relations of ozone, and the action of the electrical discharge on oxygen and other gases. (Philos. Trans. Roy. Soc., 1860, pp. 113–131.) 1 plate. 4to. *London, 1860*

General results of the action of the electrical discharge on pure oxygen; appearance of ozone at the positive pole in the electrolysis of water.
—See also 2738, 3650.

3164. **Becquerel,** (Alexandre) E(dmond). (1820–1891.) Note on the use of sulphate of lead in voltaic couples. (Philos. Mag., Ser. IV, Vol. 19, pp. 469, 470.) 8vo. *London, 1860*

Modification of the sulphate of lead battery invented by the author's father.

3165.— —Observations on the use of insoluble compounds in voltaic piles. (Philos. Mag., Ser. IV, Vol. 19, p. 404.) 8vo. *London, 1860*

Lead sulphate in voltaic batteries.
—See also 2927.

3166. **Carl,** Ph. On the galvanic polarization of buried metal plates. (Philos. Mag., Ser. IV, Vol. 20, pp. 377–379.) 8vo. *London, 1860*

The zinc plates were buried on the north, south, east and west side of the Observatory garden, Munich and, on being connected with a galvanometer, gave distinct indications of polarization.

3167. **Challis,** J(ames). (1803–1882.) A theory of molecular forces. (Philos. Mag., Ser. IV, Vol. 19, pp. 88–102.) 8vo. *London, 1860*

The author's theory admits of no other kind of action than the pressure of an elastic fluid medium, the æther.

3168.— —A theory of the force of electricity. (Philos. Mag., Ser. IV, Vol. 20, pp. 280–290.) 8vo. *London, 1860*

"Physical forces are all consequences of the motions and pressures of a uniform and highly elastic medium pervading all space."

3169.— —A theory of galvanic force. (Philos. Mag., Ser. IV, Vol. 20, pp. 431–441.) 8vo. *London, 1860*

The facts of the electric current explained by the dynamical action of the *aetherical fluid.*
—See also 3123.

3170. **Davy,** John. (1790–1868.) On the electrical condition of the egg of the common fowl. (Philos. Mag., Ser. IV, Vol. 19, p. 55.) 8vo. *London, 1860*

Current obtained by plunging wires into the white and the yolk of an egg.
—See also 2666.

3171. **Delprat,** I(saac) P(aul). (1793–1880.) Over den wederstand van holle cilinders of buizen tegen imvendige normale drukkingen. (Verslag, Akad. Wetensch., Vol. 10, pp. 70–85.) 8vo.
Amsterdam, 1860

Mechanical resistance of hollow cylinders.

3172. **Faraday,** M(ichael). (1791–1867.) On lighthouse illumination. —The electric light. (Proc. Roy. Instit., Vol. 3, pp. 220–223.) 8vo. *London, 1860*

Holmes's machine at the South Foreland lighthouse; lamp used in the early days (1860) of electric illumination.

3172a.— —(The same paper.) (Philos. Mag., Ser. IV, Vol. 19, pp. 320–323.) 8vo. *London, 1860*
—See also 2549.

3173. **Gassiot,** J(ohn) P(eter). (1797–1877.) On the application of electrical discharges from the induction coil to the purposes of illumination. (Philos. Mag., Ser. IV, Vol. 20, p. 550.) 8vo.
London, 1860

Note on the light given out by a spiral carbonic-acid vacuum tube.

3174.— —On the electrical discharge in vacuo with an extended series of the voltaic battery. (Philos. Mag., Ser. IV, Vol. 19, pp. 59, 60.) 8vo. *London, 1860*

3175.— —On the interruption of the voltaic discharge in vacuo by magnetic force. (Philos. Mag., Ser. IV, Vol. 20, pp. 74, 75.) 8vo. *London, 1860*

3176.— —On vacua as indicated by the mercurial siphon-gauge and the electrical discharge. (Philos. Mag., Ser. IV, Vol. 20, pp. 223, 224.) 8vo. *London, 1860*

Note on experiments with an exhausted tube in which the pressure could be varied by means of caustic potash.

3177.— —On the luminous discharge of voltaic batteries, when examined on carbonic acid vacua. (Philos. Mag., Ser. IV, Vol. 20, pp. 540–548.) 8vo. *London, 1860*

Experiments on the electric discharge in rarefied media, made with a water-battery of 3,520 cells, a Grove battery of 400 cells, and a battery of 512 Daniell cells; study of the striated discharge.
—See also 2819.

3178. **Gaugain,** J(ean) M(othée). (1811–1880.) On the law of propagation of electricity in imperfect conductors. (Philos. Mag., Ser. IV, Vol. 20, pp. 401–403.) 8vo. *London, 1860*

The author finds that Ohm's law is applicable in the case of a constant flow of electricity other than that derived from voltaic batteries.
—See also 3129.

3179. **Georges.** La galvano-caustique appliquée à la cure des maux de dents et des nevralgies en particulier. 16 pp. 8vo.
Paris, 1860

Use of the electrical current in dentistry.

3180. **Gladstone,** J(ohn) H(all). (1827–1902.) On the electric light of mercury. (Philos. Mag., Ser. IV, Vol. 20, pp. 249–253.) 8vo. *London, 1860*

Electric light due to an interrupted stream of mercury.
—See also 1832, 3396, 3784, 3938.

3181. **Gore,** G(eorge). Note on the specific gravity of electro-deposited amorphous antimony. (Philos. Mag., Ser. IV, Vol. 19, p. 403.) 8vo. *London, 1860*

3182.— —On the movements of liquid metals and electrolytes in the voltaic circuit. (Philos. Mag., Ser. IV, Vol. 20, pp. 149–164.) 8vo. *London, 1860*

Conditions under which the movements are produced and their causes; general electro-capillary phenomena.

3182a.— —(The same paper.) (Proc. Roy. Soc., Vol. 10, pp. 325–355.) 8vo. *London, 1860*
—See also 3022.

3183. **Grove,** (Sir) W(illiam) R(obert). (1811–1896.) Electrolysis through glass. (Philos. Mag., Ser. IV, Vol. 20, pp. 126–128.) 8vo. *London, 1860*

Electrolysis said to take place by induction across the thin glass of the Florence flask which was used in the experiments.
—See also 2802.

3184. **Guillemin,** C(laude) M(arie). (1822–1890.) Mémoire sur la propagation des courants dans les fils télégraphiques. 64 pp. 1 plate. 8vo. *Paris, 1860*

Experiments on the duration of the variable stage of an electric current; velocity of propagation in conductors of given dimensions.

3184a.— —(The same paper.) (Ann. Chim. et Phys. Ser. III, Vol. 60, pp. 385–448.) 1 plate. 8vo. *Paris, 1860*
See also 2983, 3236.

3185. **Hall,** Walter. A paper on the manufacture and application of India rubber for insulating telegraph conductors; also the construction of submarine cables. 6 l. 8vo. (*Oxford, 1860*)

Rubber and gutta-percha as insulating materials; specific gravity and cables. The author had twenty-eight years experience in the manufacture and application of India-rubber and gutta-percha.

3185a.— —(The same paper.) (Civil Engin. and Archit. Journ., Vol. 23, pp. 269–273.) Folio. *London, 1860*
—See also 5551, 5847.

3186. **Hamel,** J(oseph). (1788–1862.) Entstehung der galvanischen und elektromagnetischen Telegraphie. (From Bull. Acad. Sc., St. Petersbourg, Vol. 2.) 58 pp.+Nachtrag 8 pp. 8vo. *St. Petersburg, 1860*

Critical work on early history of the electric telegraph.
—See also 1457.

3187. **Hankel,** W(ilhelm) G(ottlieb). (1814–1899.) On the electric deportment of the flame of alcohol. (Philos. Mag., Ser. IV, Vol. 19, pp. 9–11.) 8vo. *London, 1860*

3188. **Hearder,** J(onathan) N(ash). (1809–1876.) Notes on electrical conductivity. (Philos. Mag., Ser. IV, Vol. 19, pp. 14–19.) 8vo.
London, 1860

The author finds the order in which metals are heated by the electric current the inverse of that obtained when the Leyden jar discharge was used.
—See also 2916.

3189. **Jacquemin,** E(ugène Théodor). Électrographie; ou, Gravure en relief par l'électricité. pp. 61–76. 4 plates. 4to. (Dissertation.) *Strasburg, 1860*

Electrography, or the art of engraving by means of soluble electrodes.

3190. **Loomis,** Elias. (1811–1889.) The great auroral exhibition of August 28th to September 4th, 1859, and the geographical distribution of auroras and thunder-storms. (Amer. Journ. Sc. & Arts, Ser. II, Vol. 30, pp. 79–100.) 1 map. 8vo.
New Haven, 1860

Observations on the Northern light made at different places with chart.
—See also 2866.

3191. **Le Roux,** (François Pierre). On the production of ozone by means of a platinum wire made incandescent by an electric current. (Philos. Mag., Ser. IV, Vol. 19, p. 403.) 8vo.
London, 1860

—See also 1724, 3507 bis, 3550, 3584.

3192. **M'Clintock,** (Sir) F(rancis) Leopold. Letter to Sir Charles Bright. 2 l. Folio. *Portsmouth, 1860*

Iceland, Greenland and Labrador briefly considered.

3193. **Matteucci,** Carlo. (1811–1868.) On the electrical phenomena which accompany muscular contraction. (Philos. Mag., Ser. IV, Vol. 20, pp. 388–390.) 8vo. *London, 1860*

Investigation to ascertain the nature of the electrical phenomena which accompany muscular contraction.
—See also 2728.

3194. **Matthiessen,** A(ugustus). (1831–1870.) On the effect of the presence of metals and metalloids upon the electric conducting power of pure copper. (Philos. Trans. Roy. Soc., 1860, pp. 85–92.) Ill. 4to. *London, 1860*

There is no alloy of copper which conducts electricity better than pure copper.

3194a.——On the electric conducting power of copper and its alloys. (Philos. Mag., Ser. IV, Vol. 22, pp. 545–548.) 8vo.
London, 1860

Some experiments showing the marked influence of traces of foreign metals on the conducting power of pure copper.

3195.——On the electric conducting power of alloys. (Philos. Trans. Roy. Soc., 1860, pp. 161–176.) 2 plates. 4to. *London, 1860*

Numerous tables of determinations made together with some theoretical considerations.

3195a.——(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 20, pp. 63–64.) 8vo. *London, (1860)*

Conclusions drawn from determinations of the electric conductivity of 200 alloys.

3196.——On the specific gravity of alloys. (Philos. Trans. Roy. Soc., 1860, pp. 177–184.) 4to. *London, 1860*

Specific gravity of antimony, tin, cadmium, bismuth, silver, mercury, gold.
—See also 3033.

3197. **Montigny,** Ch(arles Marie Valentin). (1819–1890.) Note sur la vitesse du bruit du tonnerre. (Bull. Acad. Sc., Belgique, Ser. II, Vol. 9, pp. 36–46.) 8vo. *Brussels, 1860*

From certain instances, the author infers that sounds due to a sudden, violent disturbance, *e. g.*, a pistol shot, are propagated with greater velocity than those due to the human voice or a musical instrument. The conclusion favors the views of Earnshaw.
—See also 2245, 3357.

3198. **Newall,** R(obert) S(tirling). (1812–1899.) Observations on the present condition of Telegraphs in the Levant; with especial reference to the concession of the line between the Dardanelles and Alexandria, and to the convention between Austria and England with regard to the line between Ragusa and Egypt. 63 pp. 1 map. 8vo. *London, 1860*

Means of establishing telegraphic communication between England, Egypt and India.
—See also 2293.

3199. **Planté,** (Raimond Louis) Gaston. (1834–1889.) New secondary pile of great power. (Philos. Mag., Ser. IV, Vol. 19, pp. 468–469.) 8vo. *London, 1860*

The lead storage battery, developed by Planté from the elementary form of Ritter.
—See also 2162.

3200. **Quincke,** G(eorg Hermann). On a new kind of electric current. (Philos. Mag., Ser. IV, Vol. 19, pp. 455–458.) 8vo. *London, 1860*

Currents due to forcing water through a clay plate.
—See also 3035.

3201. **Radcliffe,** C(harles) B(land). (1822–1889.) An inquiry into the muscular movements resulting from action of electric currents upon the nerves. (Philos. Mag., Ser. IV, Vol. 20, pp 390–400.) 8vo. *London, 1860*

The *modus operandi* of electricity in muscular motion.
—See also 1605, 3700.

3202. **Rijke,** P(ieter) L(eonhard). (1812–1901.) Note on the inductive spark. (Philos. Mag., Ser. IV, Vol. 20, pp. 441–446.) 8vo. *London, 1860*

Spark discharge of an induction coil.
—See also 913, 3251, 3312.

3203. **Ruhmkorff,** (Heinrich Daniel). (1803–1877.) Hardening of a piece of iron on being pressed against the poles of a magnet. (Philos. Mag., Ser. IV, Vol. 20, p. 328.) 8vo. *London, 1860*
—See also 3979.

3204. **Schneider,** Emile. Memoir on electric cables and sounding lines. 8 pp. 1 plate. 4to. (*London, 1860?*)
Defects of the Atlantic cable, p. 2.

3205. **Schnirch,** Fr. Die erste (dies- und jenseits des Oceans) ausgefuehrte Kettenbruecke fuer den Lokomotivbetrieb. 16 pp. 1 plate. 4to. *Vienna, 1860*
Bridge, across the Danube at Vienna.

3206. **Shaffner,** T(aliaferro) P(reston). (1818–1881.) On the geography of the North Atlantic Telegraph. (Civil Engin. and Archit. Journ., Vol. 23, pp. 275–276.) 4to. *London, 1860*
The proposed telegraphic route *via* the Faroe Islands, Iceland, Greenland and Labrador.
—See also 1467.

3207. **Siemens,** (Ernst) Werner (1816–1892) & K(arl) W(ilhelm) (Sir Charles William) **Siemens.** (1822–1883.) On a new method of insulating submarine telegraph conductors with India rubber or its compounds. (Civil Engin. and Archit. Jour., Vol. 23, pp. 273–275.) 4to. *London, 1860*
Machinery for drawing tight the India-rubber covering on the wire so as to exclude atmospheric air.
—See also 3107, 3259.

3208. **Stewart,** Balfour. (1828–1887.) An account of the construction of the self-recording magnetographs at the Kew Observatory. (Report, British Ass. Adv. Sc., 1860, pp. 200–228.) 3 plates. 8vo. *London, 1860*
Illustrated account of the instrument with details of the photographic processes used at the Kew Observatory.
—See also 3149.

3209. **Taylor,** J(ohn) W(illiam). Remarks on Greenland and its ice in reference to the Atlantic telegraph. With remarks to accompany the soundings of H. M. S. *Bulldog.* (Copy from MS.) 8+11 pp. Folio. (*London, 1860?*)
Suitability of the Greenland coast for landing the Atlantic cable.

3210. **Thomsen,** (Hans Peter Jorgen) Julius. A constant copper-carbon battery. (Abstract.) (Philos. Mag., Ser. IV, Vol. 21, p. 80.) 8vo. *London, 1860*
The battery consisted of copper in dilute sulphuric acid and carbon in a mixture of bichromate of potash, sulphuric acid and water; the combination is theoretically interesting; the author was a noted investigator.
—See also 1628.

3211. **Thomson,** (Sir) William (Lord Kelvin). (1824–1907.) Measurement of the electrostatic force produced by a Daniell's battery. (Philos. Mag., Ser. IV, Vol. 20, pp. 233–239.) 8vo. *London, 1860*
The author's *absolute electrometer* was used in determining the *e. m. f.* of a battery.

3212.——Measurement of the electromotive force required to produce a spark in air between parallel metal plates at different distances. (Philos. Mag., Ser. IV, Vol. 20, pp. 316-326.) 8vo. *London, 1860*

The electrostatic forces were determined by the absolute and portable electrometers of the author; the appendix contains numerous important definitions and considerations.

3213.——Notes on atmospheric electricity. (Philos. Mag., Ser. IV, Vol. 20, pp. 360–363.) 8vo. *London, 1860*

Observations made with the author's water-dropping collector; Beccaria's experiments on the electricity of the atmosphere.
—See also 2946.

3214. **Tyndall,** John. (1820–1893.) Note on the transmission of radiant heat through gaseous bodies. (Philos. Mag., Ser. IV, Vol. 19, pp. 60–61.) 8vo. *London, 1860*

The author's experimental tube with which he showed that different gases intercept radiant heat in different degrees.

3215.——On the influence of magnetic force on the electric discharge. (Philos. Mag., Ser. IV, Vol. 19, pp. 238–242.) 8vo. *London, 1860*

Experiments illustrating the constitution of the electric discharge; battery of 400 Grove cells used; Gassiot's results with water battery of 3,500 cells.
—See also 2950.

3216. **Volpicelli,** (Paolo). (1804–1879.) On atmospheric electricity. (Philos. Mag., Ser. IV, Vol. 20, pp. 327–328.) 8vo. *London, 1860*

Results of experiments made with an exploring rod raised over the Physical Museum of the Roman University; abridged from the Comptes Rendus of July 16, 1860.
—See also 3155.

3217. **Wallich,** G(eorge) C(harles). (1815–1899.) Notes on the presence of animal life at vast depths in the sea, with observations on the nature of the sea bed, as bearing on submarine telegraphy. 38 pp. 8vo. *London, 1860*

Necessity of a careful survey for deep-sea cables.
—See also 3423.

3218. **Webb,** F(rederick) C(harles). (1828–1899.) Malta, Tripoli, and Alexandria telegraph. 6 pp. Folio. *London, 1860*

Advantages of the telegraphic project submitted.
—See also 3111.

3219. **Wiedemann,** G(ustav Heinrich). (1826–1899.) On the conductivity of certain alloys for heat and electricity. (Philos. Mag., Ser. IV, Vol. 19, pp. 243–244.) 8vo. *London, 1860*

The author finds that the agreement known to exist between the thermal and the electrical conductivity of metals holds also for alloys.
—See also 1537, 2979, 3329, 3478.

3220. **Woolhouse,** W. S. B. On the deposit of submarine cables. (Philos. Mag., Ser. IV, Vol. 19, pp. 345–364.) 8vo. *London, 1860*

Mathematical theory of the submergence of cables.

3221. **Wright,** T. Strethill. Remarks on the behavior of mercury as an electrode. (Philos. Mag., Ser. IV, Vol. 19, pp. 129–133.) 8vo. *London, 1860*

3222. **The Atlantic** cable. (Nautical Mag., Vol. 29, pp. 337–355.) 8vo. *London, 1860*

The bed of the Atlantic; submarine volcanoes.

3223. **Electric** clocks.—Electricity for blasting in mines and quarries. — Electric l'ght.— —Electric weaving. — Electro-metallurgy. — —Electro-motive engines.—Electro-plating and gilding iron. — Electro-sorting apparatus. — Electro-telegraphy. — (Ure's Dictionary of Arts, Vol. 2, pp. 79–113.) 8vo. *London, 1860*

3224. **Electricity** and the electric telegraph. (Cornhill Mag., Vol. 2, pp. 61–73.) 8vo. *London, 1860*

Review and discussion of electric discovery. C. M. of the Scots Magazine, 1753, said to be *Charles Marshall*, p. 66. (See No. 378.)

3225. **Blair,** George. Some results in electro-magnetism obtained with the balance galvanometer. (Philos. Mag., Ser. IV, Vol. 21, pp. 311–314.) 8vo. *London, 1861*

The galvanometer was constructed to give an exact measure by weight of the deflective force which the current exerts upon the magnetic needle of the instrument.

3226. **Challis,** J(ames). (1803–1882.) A theory of magnetic force. (Philos. Mag., Ser. IV, Vol. 21, pp. 65–72+92–106.) 8vo. *London, 1861*

Application of the author's hydrodynamical theory to the explanation of magnetic phenomena.

3227.— —On theories of magnetism and other forces in reply to remarks by Professor Maxwell. (Philos. Mag., Ser. IV, Vol. 21, pp. 250–254) 8vo. *London, 1861*

The theory of Professor Challis is that physical forces are modes of action of the pressure of the ether which is a continuous fluid medium, having the property of pressing in proportion to its density, and filling all space not occupied by the discrete atoms of sensible bodies, which atoms are inert, spherical, and of different but constant magnitudes. (See No. 3247.)

—See also 3123.

3228. **Clark,** (Josiah) Latimer. (1822–1898.) Circular announcing partnership with (Sir) Charles (Tilston) Bright. *1861*

3228a.— —Circular announcing dissolution of the partnership. *1865*

3229.— —On electrical quantity and intensity. (Proc. Roy. Instit., Great Britain, Vol. 3, pp. 337–341.) 8vo. *London, 1861*

—See also 2897.

3230. **Croll,** James. (1821–1890.) Remarks on Ampère's experiment in the repulsion of a rectilinear electrical current on itself. (Philos. Mag., Ser. IV, Vol. 21, pp. 247–250; Vol. 23, pp. 365–367.) 8vo. *London, 1861–1862*

Considerations on the nature of the electric current. (See No. 3233.)

—See also 3283.

3231. **Dunn,** Edward T. India-rubber or caoutchouc: its past, present, and probable future. To which is added a review of the government report on submarine telegraphy. 22 pp. 8vo.
London, 1861

3232. **Fleury,** A. L. Description of new magneto-electric machines. (Journ. Franklin Instit., Vol. 72, pp. 418–424.) 8vo
Philadelphia, 1861

Description of Van der Weyde's magneto-electric machine. Van der Weyde was Professor for some time in Cooper Institute, New York.

3233. **Forbes,** J(ames) D(avid). (1809–1868.) Note respecting Ampère's experiment on the repulsion of a rectilinear electrical current on itself. (Philos. Mag., Ser. IV, Vol. 21, pp. 81–86.) 1 plate. 8vo. (See No. 3230.) *London, 1861*

—See also 2680.

3234. **Gaugain,** J(ean) M(othée). (1811–1880.) On the theory of cylindrical condensers. (Philos. Mag., Ser. IV, Vol. 21, pp. 539–540.) 8vo. *London, 1861*

Note on the propagation of an electric current through a submarine cable.
—See also 3129.

3235. **Gore,** George. Preliminary note on the production of vibrations and musical sounds by electrolysis. (Philos. Mag., Ser. IV, Vol. 22, p. 555.) 8vo. *London, 1861*

If a large quantity of electricity is made to pass through a suitable electrolyte into a small surface of pure mercury, strong vibrations will occur.

3235a.— —On the production of vibrations and sounds by electrolysis. (Philos. Mag., Ser. IV, Vol. 24, pp. 401–402.) 8vo.
London, 1862

The author considers the vibrations to have an electro-chemical origin resulting from an attraction between the mercury of the negative electrode and the mercury of the electrolyte.
—See also 3022.

3236. **Guillemin,** C(laude) M(arie). (1822–1890.) Note sur le nombre maximum de signaux télégraphiques élementaires qu'on peut transmettre, dans un temps donné, au moyen de l'appareil Morse. (Extract, Ann. Télégr., Ser. II, Vol. 4.) 4 pp. 8vo.
Paris, 1861

A few instances of rapid telegraphic transmission.
—See also 3184.

3237. **Jenkin,** (Henry Charles) Fleeming. (1833–1885.) On the insulating properties of gutta-percha. (Philos. Mag., Ser. IV, Vol. 21, pp. 75–79.) 8vo. *London, 1861*

Tables and formulae by which the resistance of a new cable coated with gutta-percha may be approximately estimated.
—See also 3137.

3238. **Lloyd,** Humphrey. (1800–1881.) On earth-currents, and their connexion with the diurnal changes of the horizontal mag-

netic needle. (Philos. Trans. Roy. Soc., 1861, pp. 115–141.) 2 plates. 4to. *London, 1861*

The author endeavors to show that the diurnal variation of the horizontal magnetic needle is due to electric currents traversing the crust of the earth; bibliography of the subject.

3238a.——On earth-currents and their connexion with the phenomena of magnetism. (Philos. Mag., Ser. IV, Vol. 22, pp. 437–442.) 8vo. *London, 1861*

The author, a distinguished investigator of terrestrial magnetic phenomena, gives reasons for his convictions that all changes of terrestrial magnetism both periodic and irregular can be explained by earth-currents.

3238b.——(The same paper.) (Proc. Roy. Irish Acad., Vol. 8, pp. 313–318.) 1 plate. 8vo. *Dublin, 1861*

3238c.——On earth-currents in connexion with magnetic disturbances. (Proc. Roy. Irish Acad., Vol. 8, pp. 392–396.) 8vo. *Dublin, 1862*

—See also 2726.

3239. **Magnus,** (Heinrich) G(ustav). (1802–1870.) On the changes in induced currents by the employment of different resistances. (Philos. Mag., Ser. IV, Vol. 22, pp. 522–529.) 8vo. *London, 1861*

The experiments were made with Leyden batteries; they gave indications of the oscillatory character of the discharges.

—See also 3065.

3240. **Mangon,** (Charles François) Hervé (also Hervé-Mangon). (1821–1888.) Production of the green matter of leaves under the influence of the electric light. (Philos. Mag., Ser. IV, Vol. 22, pp. 327–328.) 8vo. *London, 1861*

The experiments showed that the green-coloring matter develops favorably under the influence of the electric (arc) light.

3241. **Marianini,** Stefano (Giovanni). (1790–1866.) Di alcune maniere di applicare l'elettricita ad una persona isolata con avvertenze circa l'uso della Boccia di Leida nello scuotere le persone e relazione di cure eseguite coll'elettricita somministrata dalla macchina elettrica. 16 pp. Folio. *Modena, 1861*

Cures effected by the application of static electricity.

—See also 1024.

3242. **Marsh,** Benjamin. The aurora, viewed as an electric discharge between the magnetic poles of the earth, modified by the earth's magnetism. (Amer. Journ. Sc. & Arts, Ser. II, Vol. 31, pp. 311–318.) 2 plates. 8vo. *New Haven, 1861*

Comparison between the appearances of polar aurorae and certain phenomena of vacuum tubes.

3243. **Marshman,** J. C. Red Sea telegraph. 31 pp. 8vo. *1861*

The cable proposed for the Red Sea, p. 16.

3244. **Matteucci,** (Carlo). (1811–1868.) On electric endosmose. (Philos. Mag., Ser. IV, Vol. 21, pp. 159–160.) 8vo. *London, 1861*

Endosmotic effects due to secondary electrolytic action.

—See also 2728.

3245. **Matthiessen,** A(ugustus). (1831–1870.) On an alloy which may be used as a standard of electrical resistance. (Philos. Mag., Ser. IV, Vol. 21, pp. 107–115.) 8vo. *London, 1861*

Four qualities that an alloy for a standard of resistance should fulfil; gold-silver alloy recommended.

3245a.——(The same paper.) A reprint. *London, 1861*

3246.——Some remarks on Dr. Siemens's paper "On Standards of electrical resistance and on the influence of temperature on the resistance of metals. (Philos. Mag., Ser. IV, Vol. 22, pp. 195–202.) 8vo. *London, 1861*

Degree of accuracy in absolute measurements of resistance. (See No. 3258.)
—See also 3033.

3247. **Maxwell,** J(ames) C(lerk). (1831–1879.) The theory of molecular vortices applied to electric currents. (Philos. Mag., Ser. IV, Vol. 21, pp. 281–291+338–348.) 1 plate. 8vo. *London, 1861*

A mathematical paper; lines of force indicate the direction of *minimum pressure* at every point of the medium. (See No. 3227.)
—See also 3034.

3248. **Militzer,** Hermann. Beitraege zur Theorie und Construction des Relais. (Zeitschr. Telegr. Vereins, Year 8, pp. 219–237.) 4 plates. 4to. *Berlin, 1861*

Inquiry into the theory and construction of telegraph relays.
—See also 3467, 3607.

3249. **Oppel,** O. O. Notiz ueber eine eigentuemliche Wirkung des verstaerkten elektrischen Funkens auf Glasflaschen. (Jahresber. Phys. Ver., Frankfurt, 1869–1861, pp. 38–41.) 8vo. *Frankfort, 1861*

3250. **Riess,** P(eter Theophil). (1804–1883.) On electrical partial discharges. (Philos. Mag., Ser. IV, Vol. 21, pp. 542–543.) 8vo. *London, 1861*

Note on the discharge of Leyden jars through such resistances as a wet string and a column of water.
—See also 862, 2639, 2651, 3412.

3251. **Rijke,** P(ieter) L(eonhard). (1812–1901.) On the duration of the spark which accompanies the discharge of an electrical conductor. (Philos. Mag., Ser. IV, Vol. 21, pp. 365–369.) 8vo. *London, 1861*

Experiments showing retardation of the discharge of Leyden jars due to resistances in the discharge-circuit; Wheatstone criticized.
—See also 3202.

3252. **Romanoff,** D. Telegraphic communication between Europe, America, China, Japan, and the East Indies, via Siberia. (Morning Post, Oct. 3, 1861.) 15 pp. 8vo. *London, 1861*

The route recommended is "a safer and better one than through the wild steppes of Asia Minor and Persia," p. 15.

3253. **Ronalds,** (Sir) Francis. (1788–1873.) (Letter written in Italy to Latimer Clark about collection of works on electricity and magnetism, dated September 12, 1861.) *1861*
For reproduction of letter (which should have been entered in Vol. I), see No. 731.
—See also 2534.

3254. **Sabine,** (Sir) Edward. (1788–1883.) On the laws of the phenomena of larger disturbances of magnetic declination in the Kew Observatory; with notices of the progress of our knowledge regarding the magnetic storms. (Philos. Mag., Ser. IV, Vol. 22, pp. 310–324.) 8vo. *London, 1861*
The disturbances referred to were recorded at Kew in 1858 and 1859.

3255.— —On the lunar-diurnal variation of the magnetic declination obtained from the Kew Photograms in 1858, 1859 and 1860. (Proc. Roy. Soc., Vol. 11, pp. 73–80.) 8vo. *London, 1861*
It is inferred that the moon causes a small variation in each of the magnetic elements having a double period in every lunar day.

3255a.— —(The same paper.) (Philos. Mag., Ser. IV, Vol. 22, pp. 479–484.) 8vo. *London, 1861*

3256.— —On the secular change in the magnetic dip in London between the years 1821 and 1862. (Proc. Roy. Soc., Vol. II, pp. 144–162.) 8vo. *London, 1861*
"The regularity and uniformity with which the secular magnetic changes continue through long intervals of time together with their sudden periodic reversals wear the aspect of effects of some yet unascertained cosmical cause," p. 162.

3256a.— —(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 23, pp. 223–238.) 8vo. *London, 1862*
—See also 2544.

3257. **Siemens,** (Sir) C(harles) W(illiam). (1822–1883.) Description of a machine for covering telegraph wires with India-rubber. (Proc. Instit. Mechan. Engin., 1860, pp. 137–146.) 4 plates. 8vo. *London, 1861*
Specific inductive capacity of gutta-percha and India-rubber; general remarks on materials used for insulation.

3258.— —A new resistance thermometer. (Philos. Mag., Ser. IV, Vol. 21, pp. 73–74.) 8vo. *London, 1861*
The thermometer is based on the fact that the conductivity of a copper wire increases in a simple ratio as its temperature decreases. (See No. 3246.)
—See also 3107.

3259. **Siemens,** (Ernst) Werner. (1816–1892.) Proposal for a new reproducible standard measure of resistance to galvanic currents. (Philos. Mag., Ser. IV, Vol. 21, pp. 25–38.) 1 plate. 8vo. *London, 1861*
A prism of mercury one meter long and one millimeter in section at O°. C. proposed as the unit of resistance.
—See also 1214, 3207, 3472, 3518, 3564, 3845, 4161.

3260. **Stewart,** Balfour. (1828–1887.) On the great magnetic disturbance which extended from August 28 to September 7,

1859, as recorded by photography at the Kew Observatory. (Philos. Trans. Roy. Soc., 1861, pp. 423–430.) 3 plates. 4to. *London, 1861*

The auroral display was one of unprecedented magnificence; it was widely observed and was accompanied with violent and excessive disturbances of terrestrial magnetism.

3260a.——(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 24, pp. 315–317.) 8vo. *London, 1862*

—See also 3149.

3261. **Stoney,** G(eorge) Johnstone. On the amount of the direct magnetic effect of the sun or moon on instruments at the earth's surface. (Philos. Mag., Ser. IV, Vol. 22, pp. 294–299.) 8vo. *London, 1861*

"Though the sun or moon were as highly magnetized as the earth, their direct effects would be so small as to be masked by the more powerful, unknown perturbating causes which the observations prove to be at work."

—See also 3323, 3770.

3262. **Tate,** Thomas (Turner). (1807–1888.) On a new electrometer (The Siphon Electrometer) for measuring the electrical charge of the prime conductor of a machine; and on dispersion of different liquids by electrical action. (Philos. Mag., Ser. IV, Vol. 21, pp. 452–457.) 8vo. *London, 1861*

This *Siphon electrometer* is based on the principle that different quantities of electricity discharge different quantities of liquid from a siphon tube in which the said liquid is held by capillary action.

—See also 1302.

3263. **Thomson,** (Sir) William. (Lord Kelvin.) (1824–1907.) On the secular cooling of the earth. (Trans. Roy. Soc. Edinburgh, Vol. 23, pp. 157–169.) 1 plate. 4to. *Edinburgh, 1861*

"The chief object of the present communication is to estimate from the known general increase of temperature in the earth downwards and the date of the first establishment of that *consistentior status* which, according to Leibnitz's theory is the initial date of all geological history."

3264.——On the measurement of electric resistance. (Proc. Roy. Soc., Vol. 11, pp. 313–329.) 8vo. *London, 1861*

"Bridge" measurement of resistance with method of avoiding sensible error arising from uncertainty of connections.

3264a.——(The same paper.) (Philos. Mag., Ser. IV, Vol. 24, pp. 149–162.) 8vo. *London, 1862*

—See also 2946.

3265. **Thomson,** (Sir) William (Lord Kelvin) (1824–1907) and (Henry Charles) Fleeming **Jenkin.** (1833–1885.) On the true and false discharge of a coiled electric cable. (Philos. Mag., Ser. IV, Vol. 22, pp. 202–211.) 8vo. *London, 1861*

Polarization of earth-plates found to be very small; experiments with cables.

—See also 2946, 3137.

3266. **Tichanowitsch.** On electrolysis of organic bodies. (Philos. Mag., Ser. IV, Vol. 22, p. 30.) 8vo. *London, 1861*

Alcohols and oils subjected to current from batteries of 900 cells.

3267. **Weyde,** P. H. van der. (1813–1895.) The different methods of using electricity to ignite inflammable substances. (Trans. Amer. Instit.; Proc. Polytech. Ass., 1861, pp. 547–554.) 8vo. *New York, 1861*

The induction coil used for lighting a number of gas jets.
—See also 991 bis, 3569.

3268. **Vinchent,** J(ulien). (1822–1887.) Situation des lignes télégraphiques Belges en Janvier 1861, résumé des opérations en 1860. (Extract, Ann. des Trav. Publ., Belgique, Vol. 18.) 30 pp. 8vo. *Brussels, 1861*

—See also 1305, 3422.

3269. **Walker,** Charles V(incent). (1811–1882.) On magnetic storms and earth currents. (Philos. Trans. Roy. Soc., 1861, pp. 89–131.) 3 plates. 4to. *London, 1861*

Great magnetic storm of August 29 to September 2, 1859.

3269a.——(The same paper.) (Proc. Roy. Soc., Vol. 11, pp. 105–111.) 8vo. *London, 1861*

—See also 2811.

3270. **Weber,** Wilhelm (Eduard). (1804–1891.) On the measurement of electric resistance according to an absolute standard. (Philos. Mag., Ser. IV, Vol. 22, pp. 226–240+261–269.) 8vo. *London, 1861*

—See also 2785.

3271. **West,** C(harles). (1816–1898.) A lecture on submarine telegraphy. 16 pp. 8vo. *London, 1861*

India-rubber and gutta-percha as insulating materials for cables.
—See also 1472.

3272. **Zenger,** C(harles von). On the measurement of the intensity of electric currents by means of a tangent galvanometer or a multiplier. (Philos. Mag., Ser. IV, Vol. 22, pp. 529–532.) 8vo. *London, 1861*

Criticism of a formula for the strength of current derived from the indications of a tangent galvanometer.
—See also 5852.

3273. **The First** Atlantic telegraph. (Atlantic Monthly, Vol. 7, pp. 170–184.) 8vo. *Boston, 1861*

A humorous paper.

3274. **Ocean** telegraphy. (Edinb. Review, 1861, pp. 113–143.) 8vo. *Edinburgh, 1861*

General history of telegraphy; the physics of a deep-sea cable.

3275. **Abria,** (Jérémie Joseph Benoit). (1811–1892.) Sur les lois de l'induction électrique dans les plaques epaisses. (Ann. Chim. et Phys., Ser. III, Vol. 65, pp. 257–316.) 1 plate. 8vo. *Paris, 1862*

Electric induction through thick insulators.
—See also 2774.

3276. **Achard,** Auguste. Public security on railways; and in factories where steam power is applied by means of the embrayage électrique of M. Auguste Achard as exemplified in the present International exhibition. 24 pp. 8vo. (*London*) *1862*
Electrically operated brakes.

3277. **Airy,** (Sir) G(eorge) B(iddell). (1801–1892.) Determination of the longitude of Valencia in Ireland by galvanic signals in the summer of 1862. (Greenwich Astronomical Observations, 1862, Appendix III.) 21 pp. 4to *London, 1862*

3278.——On the difference in the magnetic properties of hot rolled and cold rolled malleable iron, as regards the power of receiving and retaining induced magnetism of subpermanent character. (Philos. Trans. Roy. Soc., 1862, pp. 273–288.) 4to. *London, 1862*
Experiments showing that cold-rolled bars lose less magnetism spontaneously than hot-rolled bars.
—See also 2750.

3279. **Allan,** Thomas. Transatlantic telegraph. (Morning Chronicle, January 11, 1862.) Folio. *London, 1862*
Letter criticizing the construction of the Atlantic and existing deep-sea cables.
—See also 1377, 4553, 4583, 5537, 5565.

3280. **Becquerel, Despretz et Combes.** Rapport sur un régulateur de la lumière électrique. (Comptes rendus, Acad. Sc., Vol. 54, pp. 538–544.) 4to. *Paris, 1862*
The automatic mechanism of the Serrin lamp.
—See also 2564, 2898.

3281. **Caselli,** (Giovanni). (1815–1891.) Specimens de transmission télégraphique par le système de M. Caselli. *1862*
Specimens of despatches sent by the Caselli writing telegraph.

3282. **Clark,** (Josiah) Latimer. (1822–1898.) Diary from January 9th to March 18th, 1862. 103 pp. *1862*
The diary refers to Latimer Clark's connection with the "Malta and Alexandria and Telegraph to India Company."
—See also 2897.

3283. **Croll,** James. (1821–1890.) Ampèrian repulsion. (Philos. Mag., Ser. IV, Vol. 24, p. 326.) 8vo. *London, 1862*
Note on the self-repulsion of a rectilinear current. (See No. 3327.)
—See also 3230.

3284. **D'Abbadie,** Antoine (Thompson). (1810–1897.) Sur le tonnerre en Ethiopie. (Mém. Instit. France, Savans Etrangèrs, Vol. 16, pp. 1–158.) 4to. *Paris, 1862*
Observations made by the author on electric storms during a long sojourn in Ethiopia.

3285. **De la Rive,** A(uguste Arthur). (1801–1873.) Further researches on the aurorae boreales and the phenomena which attend them. (Philos. Mag., Ser. IV, Vol. 23, pp. 546–553.) 8vo. *London, 1862*
—See also 2627.

3287. **Dumas,** (Jean Baptiste) and (Jean René) **Benoit.** Mode of applying the electric light for mining purposes. (Philos. Mag., Ser. IV, Vol. 24, p. 408.) 8vo. *London, 1862*
Vacuum tubes recommended for lighting mines.
—See also 1854, 3778.

3288. **Fitz Roy,** (Robert) (also **Fitzroy**). (1805–1865.) An explanation of the meteorological telegraphy, and its basis now under trial at the Board of Trade. (Philos. Mag., Ser. IV, Vol. 24, pp. 395–457.) 8vo. *London, 1862*
General considerations on air-currents, storms, and weather forecasts.
—See also 1569.

3289. **Gassiot,** John P(eter). (1797–1877.) Experimental investigations on the stratified appearance in electrical discharges. Effect obtained by varying the resistance. (Proc. Roy. Soc., Vol. 12, pp. 329–340.) 2 plates. 8vo. *London, 1862*
One of the author's classic papers on the stratified discharge. Reference to the water-battery of 3,520 cells.

3290.— —On the heat which is developed at the poles of a voltaic battery during the passage of luminous discharges in air and in vacuo. (Philos. Mag., Ser. IV, Vol. 24, pp. 225–229.) 8vo. *London, 1862*
—See also 2819.

3291. **Gaugain,** J(ean) M(othée). (1811–1880.) Note on the theory of spherical condensers. (Philos. Mag., Ser. IV, Vol. 23, pp. 245–248.) 8vo. *London, 1862*
Electric charge of a spherical condenser; experimental confirmation of theory.

3292.— —Note on the limit of the charge of condensers. (Philos. Mag., Ser. IV, Vol. 24, pp. 495–496.) 8vo. *London, 1862*
The author's conclusion is: that solid insulators, submitted to the influence of electricity, behave exactly like metals, and that inductive capacity is not distinct from conductivity.
—See also 3129.

3293. **Gherardi,** S(ilvestro). (1802–1879.) Sul magnetismo polare di Palazzi ed altri edifizi in Torino. (Mem. Accad. Sc. Bologna, Vol. 12, pp. 515–546.) 4to. *Bologna, 1862*
Magnetic disturbances due to certain palaces and other buildings.
—See also 3130.

3294. **Gore,** George. Electro-deposition. (Practical Mechanic's Journ., Vol. 7, pp. 546–551.) Folio. *London, 1862*
Historical sketch.
—See also 3022.

3295. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) On some new phenomena of residuary charge and the law of exploding distance of electrical accumulation on coated glass. (Philos. Mag., Ser. IV, Vol. 23, pp. 484–492.) 8vo. *London, 1862*
The object of the paper is to prove that the residual charge of a Leyden jar is not the result of electrical penetration within the glass.
—See also 2556.

3296. **Jenkin,** (Henry Charles) Fleeming. (1833–1885.) Experimental researches on the transmission of electric signals through submarine cables. Part I. Laws of transmission through various lengths of one cable. (Philos. Trans. Roy. Soc., 1862, pp. 987–1017.) 3 plates. 4to. *London, 1862*
Rate of transmission varies inversely as the square of the length; the *e. m. f.* of the battery has no appreciable effect on the velocity with which the current is transmitted; increase in resistance of the dielectric due to electric absorption rather than to any real change in the conductivity of the material.

3296a.——(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 23, pp. 483–486.) 8vo. *London, 1863*

3297.——On the construction of submarine telegraph cables. (Excerpt Minutes Proc. Instit. Mechan. Engin., 1862, pp. 211–241.) 6 plates. 8vo. *Birmingham, 1862*
Relative advantages of India-rubber and gutta-percha; construction of different deep-sea cables.
—See also 3137.

3298. **Joule,** J(ames) P(rescott). (1818–1889.) On the probable cause of electrical storms. (Philos. Mag., Ser. IV, Vol. 23, pp. 334–335.) 8vo. *London, 1862*
"It seems not unreasonable to consider the formation of hail as essential to great electrical storms."
—See also 2918.

3299. **Lamont,** J(ohann) von. (1805–1879.) On the most advantageous form of magnets. (Philos. Mag., Ser. IV, Vol. 22, pp. 369–376.) 1 plate. 8vo. *London, 1862*
That form of magnet is considered most advantageous which unites the greatest magnetic moment with the smallest mass and smallest moment of inertia.

3300.——Connexion between earthquakes and magnetic disturbances. (Philos. Mag., Ser. IV, Vol. 23, p. 59.) 8vo. *London, 1862*
Magnetic disturbances observed on December 26, 1861, accompanying an earthquake which occurred in Greece.
—See also 2803.

3301. **Loomis,** Elias. (1811–1889.) On electrical currents circulating near the earth's surface, and their connection with the phenomena of the aurora polaris. (Amer. Journ. Sc. & Arts, Ser. II, Vol. 34, pp. 34–46.) 8vo. *New Haven, 1862*
Direction of earth-currents and motion of auroral rays.
—See also 2866.

3302. **Marié-Davy,** (Edme Hippolyte). (1820–1893.) On the conductibility of saline solutions. (Philos. Mag., Ser. IV, Vol. 23, pp. 79–80.) 8vo. *London, 1862*
Conductivity of solutions of copper sulphate.

3303.——On the electromotive force of voltaic piles. (Philos. Mag., Ser. IV, Vol. 24, pp. 76–78.) 8vo. *London, 1862*
Smee's cell: influence of air dissolved in the acidulated water, degree of acidity, temperature, etc.
—See also 1182.

3304. **Matteucci,** C(arlo). (1811–1868.) On the secondary electromotor power of nerves, and its application to the explanation of certain electro-physiological phenomena. (Philos. Mag., Ser. IV, Vol. 24, pp. 311–315.) 8vo. *London, 1862*

Improvements introduced by the author in instruments for electro-physiological research.

—See also 2728.

3305. **Matthiessen,** A(ugustus) (1831–1870) and M(oritz) von **Bose.** On some gold-tin alloys. (Philos. Mag., Ser. IV, Vol. 24, pp. 320–322.) 8vo. *London, 1862*

3306.— —On the influence of temperature on the electric conducting power of the metals. (Philos. Mag., Ser. IV, Vol. 24, pp. 405–406.) 8vo. *London, 1862*

The authors find that "All pure metals in a solid state vary in conducting power to the same extent between 0° and 100° C."

—See also 3033.

3307. **Matthiessen,** A(ugustus) (1831–1870), and (Karl Christoph) **Vogt.** (1817–1895.) On the influence of traces of foreign metals on the electric conducting power of mercury. (Philos. Mag., Ser. IV, Vol. 23, pp. 171–179.) 8vo. *London, 1862*

The qualitative results given refer to zinc, tin, lead, and bismuth; peculiar behavior of mercury when alloyed with traces of other metals. (See No. 3315.)

3307a.— —Reply to R. Sabine's "Remarks on the influence of traces of foreign metals on the electric conducting power of mercury." (Philos. Mag., Ser. IV, Vol. 24, pp. 30–37.) 8vo. *London, 1862*

Rejection of the hypothesis that "the conducting power of a fluid mixture is in proportion to the conducting power of the two metals in their fluid state at the same temperature." (See No. 3315.)

—See also 3033, 3404.

3308. **Maxwell,** J(ames) C(lerk). (1831–1879.) The theory of molecular vortices applied to statical electricity. (Philos. Mag., Ser. IV, Vol. 23, pp. 12–24.) 8vo. *London, 1862*

Mathematical treatment of the subject; according to the author, the particles which form the partitions between the vortex cells constitute the *matter* of electricity.

3309.— —The theory of molecular vortices applied to the action of magnetism on polarized light. (Philos. Mag., Ser. IV, Vol. 23, pp. 85–95.) 8vo. *London, 1862*

The connection between magnetism and electricity has the same mathematical form as that between certain pairs of phenomena, of which one has a linear and the other a rotary character.

—See also 3034.

3310. **Moigno,** F(rançois Napoléon Marie) (Abbé). (1804–1884.) Machine magnéto-électrique de la compagnie l'Alliance exposée par August Berlioz. 11 pp. ill. 8vo. (*Paris, 1862?*)

—See also 1161, 2910.

3311. **Paalzow,** (Carl Adolph). (1824–1908.) On magnetizing steel needles by the current of a Leyden jar. (Philos. Mag., Ser. IV, Vol. 24, pp. 494–495.) 8vo. *London, 1862*

—See also 3514.

3312. **Rijke,** P(ieter) L(eonhard). (1812–1901.) On some properties of the induced current. (Philos. Mag., Ser. IV, Vol. 24, pp. 249–262.) 8vo. *London, 1862*

The primary current of an induction coil broken in the middle of a flame in order to increase the length of spark.
—See also 3202.

3313. **Robinson,** T(homas) R(omney). (1792–1882.) On the spectra of electric light as modified by the nature of the electrodes and the media of discharge. (Philos. Trans. Roy. Soc., 1862, pp. 939–986.) 4to. *London, 1862*

The author worked with spark-spectra; he remarks that though the "electric" spectrum may give useful indications to the analyst, it should not be trusted without full knowledge of the conditions which may affect its indications.

3313a.——(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 25, pp. 486–488.) 8vo. *London, 1863*

—See also 3144.

3314. **Sabine,** (Sir) Edward. (1788–1883.) Notices of some conclusions derived from the photographic records of the Kew declinometer in 1858, 1859, 1860 and 1861. (Philos. Mag., Ser. IV, Vol. 24, pp. 542–546.) 8vo. *London, 1862*

The discussion of the observations confirm two important conclusions, concerning magnetic disturbances: a) their periodicity and b) the coincidence of their period with the sun-spot cycle.
—See also 2544.

3315. **Sabine,** Robert. (1837–1884.) Some remarks on a paper by A. Matthiessen and C. Vogt, "On the influence of traces of foreign metals on the electric conducting power of mercury." (Philos. Mag., Ser. IV, Vol. 23, pp. 457–460.) 8vo. *London, 1862*

Matthiessen criticized for taking into account the conductivity of metals in the solid state in calculations of fluid amalgam resistances. (See No. 3307.)
—See also 1698, 3364, 3648, 3761, 3840, 3968, 4240.

3316. **Selwyn,** J. H. Explanation of the floating cylinders for laying telegraphic submarine cables. 18 pp. 1 plate. 8vo. *London, (1862)*

3317. **Siemens,** (Sir) Charles William. (1822–1883.) Electrical instruments and telegraphic apparatus. (Practical Mechanic's Journ., 1862, pp. 529–546.) ill. 4to. *London, 1862*

Some industrial applications of the electric current.
—See also 3107.

3318. **Smith,** Archibald (1813–1872) and (Sir) Frederic John Owen **Evans.** (1816–1886.) On the effect produced on the deviation of the compass by the length and arrangement of the compass needle; and on a new mode of correcting the quadrantal deviation. (Philos. Mag., Ser. IV, Vol. 23, pp. 149–151.) 8vo.
London, 1862

Use of correcting-magnets and soft-iron correctors for ships' compasses.
—See also 1702, 3444, 3543.

3319. **Sprye.** Commerce with Western China. 8 papers. 4to.
1862–1864

3320. **Sprye,** Richard, and R. H. F. **Sprye.** Aerial telegraph to Hong-Kong and the open ports of China, and a new commerce with the vast west of that empire, across Eastern-Pegue, from Rangoon. 35 pp. 1 map. 8vo. *London, 1862*

3321.——The Western-Inland-Provinces of China proper, geographically and commercially considered in connection with British Eastern-Pegue, and the port of Rangoon. 63 pp. 1 map. 8vo.
London, 1862

3322. **Stokes,** G(eorg) G(abriel). (1819–1903.) On the long spectrum of electric light. (Philos. Trans. Roy. Soc., 1862, pp. 599–619.) 4to. *London, 1862*

Spark spectra of metals; spectrum of the electric arc; effect of the size, form and nature of the electrodes.

3322a.——(The same paper.) (Philos. Mag., Ser. IV, Vol. 25, pp. 310–311.) 8vo. *London, 1863*

3323. **Stoney,** G(eorge) Johnstone. Note on the correction for the length of the needle in tangent-galvanometers. (Philos. Mag., Ser. IV, Vol. 23, pp. 345–347.) 8vo. *London, 1862*

Formula for the strength of a current derived from the deflection of a tangent galvanometer when the length of the magnet is taken into account.
—See also 3261.

3324. **Tait,** Peter (Guthrie) (1831–1900), and J(ames) A(lfred) **Wanklyn.** Note on the electricity developed during evaporation and during effervescence from chemical action. (Philos. Mag., Ser. IV, Vol. 23, pp. 494–496.) 8vo. *London, 1862*

Friction considered to be the main cause of the development of electricity in evaporation.
—See also 3650.

3325. **V . . .,** L. L. Application de la télégraphie électrique aux usages domestiques. (Revue Gén. Architect. et Trav. Publ., Vol. 19, 1–42.) ill. 8vo. *Paris, 1862*

Batteries and electric bells.

3326. **Breda,** (Jacques Jacob Gisb. Sam.) van. (1788–1867.) Remarks on Ampère's experiment on the repulsion of a rectilinear electrical current on itself. (Philos. Mag., Ser. IV, Vol. 23, pp. 140–145.) 8vo. *London, 1862*

3327. **Breda,** (Jacques Jacob Gisb. Sam.) van (1788–1867) and W(illiam) M(artinus) **Logeman.** On Ampèrian repulsion. (Philos. Mag., Ser. IV, Vol. 24, pp. 126–127.) 8vo. *London, 1862*

Brief reply to James Croll's criticisms. (See No. 3283.)

3328. **Walker,** Charles V(incent). (1811–1882.) On magnetic calms and earth-currents. (Philos. Trans. Roy. Soc., 1862, pp. 203–219.) 4to. *London, 1862*

Currents of electricity are at all times moving in definite directions in the earth and their direction is not determined by local causes.

3328a.——(The same paper.) Abstract. (Proc. Roy. Soc., 1862.) 6 pp. 8vo. *London, 1862*

—See also 2811.

3329. **Wiedemann,** G(ustav Heinrich). (1826–1899.) Ueber elektrische Beleuchtung. (Handbuch der Chem. Technologie, Vol. I, pp. 151–172.) ill. 8vo. *Berlin, 1862*

Electric lighting, for the general reader.
—See also 3219.

3330. **Long-sea** telegraphs. (All the Year Round, 1862, pp. 9–12+38–44.) 8vo. *London, 1862*

Paper of general historical and technical information.

3331. **Die Wunderleistungen** des Telegraphen. (Didaskalia, No. 129, May 10, 1862.) 4to. *Frankfort, 1862*

Popular note on the achievements of the electric telegraph.

3332. **Airy,** (Sir) G(eorge) B(iddell). (1801–1892.) On the strains in the interior of beams. (Philos. Trans. Roy. Soc., 1863, pp. 49–71.) 3 plates. 4to. *London, 1863*

3333.——First analysis of one hundred and seventy-seven magnetic storms registered by the magnetic instruments in the Royal Observatory, Greenwich, from 1841 to 1857. (Philos. Trans. Roy. Soc., 1863, pp. 617–648.) 4to. *London, 1863*

Numerical value and analysis of the photograms registered.
—See also 2750.

3334. **Bache,** A(lexander) D(allas). (1806–1867.) Records and results of a magnetic survey of Pennsylvania and parts of adjacent states in 1840 and 1841 with some additional records and results of 1834–1835, 1843 and 1862. (Smithsonian Contributions to Knowledge.) 82 pp. 4to. *Washington, 1863*

The observations comprised declination, dip and total force.
—See also 2700.

3335. **Callan,** N(icholas) J. On an induction coil of great power, and on the effects of connecting plates with the ends of the secondary coil. (Philos. Mag., Ser. IV, Vol. 25, pp. 413–417.) 8vo. *London, 1863*

Father Callan was among the earliest investigators of the theory and phenomena of the induction coil.
—See also 2859.

3336. **Cazin,** A(chille Auguste). (1832–1877.) On a method of varying the tension of the discharge of an electric battery, and of a Ruhmkorff's coil. (Philos. Mag., Ser. IV, Vol. 25, pp. 410–411.) 8vo. *London, 1863*

The discharge of Leyden battery.

3337.— —Mémoire sur l'evaluation en unités de poids des actions électrodynamiques. (Ann. Chim. et Phys., Ser. IV, Vol. 1, pp. 257–276.) 1 plate. 8vo. *Paris, 1863*

The author's electrodynamic balance.
—See also 2228, 3598, 3644, 3718, 3775.

3338. **Challis,** J(ames). (1803–1882.) On Newton's foundation of all philosophy. (Philos. Mag., Ser. IV, Vol. 26, pp. 280–292.) 8vo. *London, 1863*

Discussion of the characteristics and mutual relations of the theoretical and experimental departments of natural philosophy.
—See also 3123.

3339. **Chambers,** Charles. (1834–1896.) On the nature of the sun's magnetic action upon the earth. (Philos. Trans. Roy. Soc., 1863, pp. 503–516.) 3 plates. 4to. *London, 1863*

The author finds that no effect of the sun's action on a magnet is sensible at the distance of the earth. The direct and the induced magnetic action of the sun not the sole cause of the diurnal variations of the magnetic elements.

3339a.— —(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 27, p. 384.) 8vo. *London, 1864*

—See also 3818.

3340. **Conte.** Rapport sur le percement du grand tunnel des Alpes. 51 pp. 4 plates. 8vo. *Paris, 1863*

The proposed tunnel under the Alps from Modena to Bardonnèche.
—See also 3388.

3341. **Coxworthy,** Franklin. (Memorial to the House of Commons concerning the author's dismissal as clerk of the Ordnance department.) 4 pp. 12mo. *London, 1863*

The memorialist is the author of a small work entitled "Electrical Condition."
—See also 2833.

3342. **De la Rive,** Lucien. On the electrical conductivity of thallium. (Philos. Mag., Ser. IV, Vol. 26, pp. 236–238.) 8vo. *London, 1863*

The paper shows how the author determined the density of thallium, the resistance of thallium wires and the temperature-coefficient.

3343. **Du Moncel,** (Théodose Achille Louis). (1821–1884.) Description des télégraphes électro-chimiques de Caselli et Bonelli. (Pantélégraphe-Typo-télégraphie.) (Ann. Télégr., Vol. 6, pp. 209–245.) 1 plate. 8vo. *Paris, 1863*

Detailed notice of Caselli's and Bonelli's "writing" telegraph.
—See also 1223, 5363.

3344. **Ellis,** William. Account of some experiments showing the change of rate produced in a clock by a particular case of magnetic action. (Philos. Mag., Ser. IV, Vol. 325–331.) 8vo. *London, 1863*

The paper shows how the rate of a clock may be changed without touching the pendulum-screw by merely adjusting a magnet.
—See also 3443, 4004, 4177, 4363.

3345. **Findlay,** Alexander G(eorge). (1812–1875.) Notes explanatory of a chart of the North Atlantic Ocean. Second edition, 16 pp., 1 map. (25x21 cm.) 8vo. *London, 1863*

These notes refer to the coasts, rocks and shoals, currents, general meteorology of the Atlantic; routes of steamships and sailing vessels.

3346. **Gaugain,** Jean M(othée). (1811–1880.) On the inductive capacity of insulating bodies. (Philos. Mag., Ser. IV, Vol. 25, pp. 556–558.) 8vo. *London, 1863*

Experiment on the time-effect on the charge of a condenser, made with coated panes of varying dimensions. The author holds that *induction* takes place by means of the ether, whereas *conduction* requires the presence of ponderable matter.
—See also 3129.

3347. **Gore,** George. On the properties of electro-deposited antimony. (Philos. Mag., Ser. IV, Vol. 25, pp. 479, 480.) 8vo. *London, 1863*

In this note the author describes two kinds of electrolytically deposited antimony possessing the property of evolving heat.
—See also 3022.

3348. **Harris,** (Sir) W(illiam) Snow. (1792–1867.) On the correct interpretation of the electrical terms intensity and tension. (Philos. Mag., Ser. IV, Vol. 26, pp. 504–515.) 1 plate. 8vo. *London, 1863*

Intensity is held to vary as the square of the quantity whilst tension varies as the first power of the quantity.
—See also 2556.

3349. **Hearder,** Jonathan N(ash). (1809–1876.) Imperfections in the present mode of fitting lightning conductors. 11 pp. 8vo. *London, 1863*

"It is impossible to draw an electrical spark from the conductor of an electrical machine without causing an electrical disturbance not only in every surface of the room but in every other room of the building," p. 10.
—See also 2916.

3350. **Jenkin,** (Henry Charles) Fleeming. (1833–1885.) On the construction of telegraphic lines. (A lecture.) 18 pp. 8vo. *London, 1863*

3350a.——On the maintenance and efficiency of telegraphic lines. (A lecture.) 18 pp. 8vo. *London, 1863*
—See also 3137.

3351. **Magnus,** (Heinrich) G(ustav). (1802–1870.) Ueber die Diathermansie trockner und feuchter Luft. (Ann. Phys. und Chem., Vol. 118, pp. 575–588.) 1 plate. 8vo. *Berlin, 1863*

Some disadvantages of the method employed by *Professor Tyndall* in his researches on the absorption of radiant heat by dry and by moist air.

3351a.——(English translation.) On the diathermancy of dry and moist air. (Philos. Mag., Ser. IV, Vol. 26, pp. 21–30.) 1 plate. 8vo. *London, 1863*

—See also 3065.

3353. **Matthiessen,** A(ugustus) (1831–1870) and (Karl Christoph) **Vogt.** (1817–1895.) On the influence of temperature on the electric conducting power of thallium and iron. (Philos. Trans. Roy. Soc., 1863, pp. 369–383.) 4to. *London, 1863*

The paper contains a table of the conducting power of pure metals at 0° C; silver being 100°, that of thallium is 9.16°.

3353a.——(The same paper.) Abstract. (Proc. Roy. Soc., Vol. 12, pp. 472–475.) 8vo. *London, 1863*

3353b.——(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 26, pp. 542–545.) 8vo. *London, 1863*

3354.——Report on the chemical nature of alloys. (Report, British Ass. Adv. Sc., 1863, pp 38–48.) 1 plate. 8vo. *London, 1863*

Conducting power of alloys for heat and electricity.

—See also 3033, 3307, 3404.

3355. **Mickle,** John. On thermo-electrical currents from the condensation of vapor and the evaporation of water. (Philos. Mag., Ser. IV, Vol. 26, pp. 435, 436.) 8vo. *London, 1863*

3356. **Miller,** W(illiam) Allen. (1817–1870.) On the photographic transparency of various bodies, and on the photographic effects of metallic and other spectra obtained by means of the electric spark. (Philos. Mag., Ser. IV, Vol. 25, pp. 304–310.) 8vo. *London, 1863*

Notes on the spark-spectra of a number of metals.

—See also 1328.

3357. **Montigny,** Ch(arles Marie Valentin). (1819–1890.) Note sur la résistance comparative des conducteurs de paratonnerres, de fer et de cuivre à la fusion par la foudre. (Bull. Acad. Sc., Belgique, Ser. II, Vol. 15, pp. 630–638.) 8vo. *Brussels, 1863*

Brief study of the liability to fusion of copper, iron and platinum points for lightning rods.

—See also 3197.

3358. **Packe,** Charles. Electric induction in the Pyrenees. (Philos. Mag., Ser. IV, Vol. 26, p. 160.) 8vo. *London, 1863*

Observations made at an altitude of 8,200 feet.

3359. **Raoult,** (François Marie). (1830–1901.) Researches on chemical heat and voltaic heat. (Philos. Mag., Ser. IV, Vol. 26, pp. 522–524.) 8vo. *London, 1863*

Normal phenomena observed in voltameter.

—See also 1581, 3411.

3360. **Reitlinger,** (Edmund). (1830?–1882.) On the stratification of the electric light. (Philos. Mag., Ser. IV, Vol. 25, pp. 317, 318.) 8vo. *London, 1863*

Differences in spectra obtained by placing the broad and the constricted part of the tube in front of the slit of the spectroscope.

3361.— —Ueber die Quellen des Lichtes. 24 pp. 12mo. *Vienna, 1863*
Tract of the source and theory of light.
—See also 1464.

3362. **Renard,** N(icolas) A(imé). Théorie du magnétisme terrestre dans l'hypothèse d'un seul fluide électrique. (Mém. Acad. de Stanislas, 1863, pp. 25–98.) 8vo. *Nancy, 1863*
The origin of terrestrial magnetism due to the double motion of the earth (translation and rotation) through the ether.
—See also 1533.

3363. **Sabine,** (Sir) Edward. (1788—1883.) Results of the magnetic observations at the Kew observatory, from 1857 and 1858 to 1862 inclusive. (Philos. Trans. Roy. Soc., 1863, pp. 273–307.) 3 plates. 4to. *London, 1863*
Discussion of the different magnetic variations and disturbances.
—See also 2544.

3364. **Sabine,** Robert. (1837–1884.) On a new determination of mercury unit of electrical resistance in Dr. Siemens' laboratory. (Philos. Mag., Ser. IV, Vol. 25, pp. 161–174.) 8vo. *London, 1863*
The mercury unit of resistance was reproduced 21 times in Dr. Siemens' laboratory *viz.* 6 times in the first determination, 5 times in the second, and 10 times in the one referred to in present paper.
—See also 3315.

3365. **Scoutetten,** (Robert Joseph) H(enri). (1799–1871.) Électro-Physiologie. (Extract, Comptes rendus, Acad. Sc., Vol. 57.) 23 pp. 8vo. *Paris, 1863*
Experiments devised by the author to show the development of electric currents by the contact of arterial and venous blood in the vessels of the animal system, these vessels serving as porous septa.

3366.— —Expériences constatant l'électricité du sang chex les animaux vivants. (Answer to the letter of J. Béclard, M.D.) 8vo. *Metz, 1863*
The author holds that the flow of blood through the veins and arteries is accompanied by an electric flux, due to resulting chemical reactions.
—See also 1372, 3416.

3367. **Siemens,** (Sir) C(harles) W(illiam). (1822–1883.) Observations on the electrical resistance and electrification of some insulating materials under pressure up to 300 atmospheres. (Report, British Ass. Adv. Sc., 1863, pp. 688–694.) 8vo. *London, 1863*
External pressure exercises a marked influence on the electrical condition of gutta-percha and India-rubber.
—See also 3107.

3368. **Smyth,** Charles Piazzi. (1819–1900.) Astronomical observations made at the Royal Observatory, Edinburgh. (Edinburgh Astron. Observ., Vol. 12, pp. i–xiv+401–575.) 1 plate. 4to. *Edinburgh, 1863*
The Teneriffe astronomical observations in 1856.
—See also 3419.

3369. **Stewart,** Balfour. (1828–1887.) On earth currents during magnetic calms, and their connection with magnetic changes. (Trans. Roy. Soc., Edinburgh, Vol. 23, pp. 355–370.) 4to. *Edinburgh, 1863*

Earth currents and changes in terrestrial magnetism.

3370. ——On the forces concerned in producing the larger magnetic disturbances. (Philos. Mag., Ser. IV, Vol. 25, pp. 480–482.) 8vo. *London, 1863*

Arguments against the hypothesis that the peaks and hollows of the magnetograph-curves are due to the direct action of earth-currents on the magnets.

—See also 3149.

3371. **Thomson,** (Sir) W(illiam) (Lord Kelvin.) (1824–1907.) On the rigidity of the earth. (Philos. Trans. Roy. Soc., 1863, pp. 573–616.) 4to. *London, 1863*

The author expresses the opinion that the earth is solid throughout and more rigid than glass; the opinion is based on nutation, precession and certain tidal phenomena.

—See also 2946.

3372. **Varley,** Cromwell F(leetwood). (1828–1883.) Description of the translating apparatus and universal galvanometer. 8 pp., 5 plates. 8vo. (*London*) *1863*

The description is illustrated with numerous diagrams.

3373. ——On the relative speed of the electric wave through submarine cables of different lengths, and a unit of speed for comparing electric cables by bisecting the electric wave. (Philos. Mag., Ser. IV, Vol. 25, pp. 548–552.) 8vo. *London, 1863*

This research deals I. with the relative speed of electric wave through cables of various lengths; II. the retarding effect of the iron sheathing; III. with methods for the increase of the speed of the electric wave.

—See also 3427, 3486, 3567, 3573, 3615, 3675, 4254, 4425, 4597, 4636, 5324, 5353.

3374. **Verdet,** M(arcel Emile). (1824–1866.) De la dispersion des plans de polarisation des rayons de diverses couleurs. Recherches sur les propriétés optiques developpées dans les corps transparents par l'action du magnétisme. (Ann. Chim. et Phys., Ser. III, Vol. 69, pp. 415–491.) 8vo. *Paris, 1863*

—See also 2925.

3375. **Walder,** Erhard. Ueber Wirkungsweise und Construktion der Blitzableiter. 9 pp. 4to. (Programm.) *Noerdlingen, 1863*

Syllabus of courses on electricity given in the agricultural and industrial school at Noerdlingen.

3376. **Wiesener,** J. On the magnetical deportment of some cyanogen compounds of iron, nickel and cobalt. (Philos. Mag., Ser. IV, Vol. 26, p. 238.) 8vo. *London, 1863*

3377. **Williamson,** A(lexander) W(illiam). On the dynamics of the galvanic battery. (Philos. Mag., Ser. IV, Vol. 26, pp. 452–462; Vol. 27, pp. 353–354.) 8vo. *London, 1863–1864*

—See also 3427, 3486, 3573.

3378. **Provisional** report of the Committee on Electrical Standards: A(lexander William) Williamson, C(harles) Wheatstone, W(illiam) Thomson, W. H. Miller, A(ugustus) Matthiessen and (Henry Charles) Fleeming Jenkin. (Report, British Ass. Adv. Sc., 1862, pp. 125–135.) 8vo. *London, 1863*

—See also 3427, 3486, 3573.

3379. **Contributions** to a history of the Atlantic cable. (From the Electrician.) 19 pp. 8vo. *London, 1863*

Notes on the electrical condition of the Atlantic cable before and after it was laid.

3380. **In memoriam:** The late John Lewis Ricardo. 1 l. 8vo. (*London, 1863*)

Obituary notice of John Lewis Ricardo, founder of the Electric Telegraph Company. To him England owed in great measure the establishment of her commercial telegraph system.

3381. **Airy,** (Sir) George Biddell. (1801–1892.) On the diurnal inequalities of terrestrial magnetism, as deduced from observations, made at the Royal Observatory, Greenwich, from 1841–1857. (Philos. Mag., Ser. IV, Vol. 27, pp. 234–236.) 8vo. *London, 1864*

Diurnal inequalities in terrestrial magnetism exhibited in curves automatically recorded by instruments which were essentially the same during the period of 17 years, 1841-1857.

3381a.——On the diurnal and annual inequalities of terrestrial magnetism, as deduced from observations made at the Royal Observatory, Greenwich, from 1858–1863; being a continuation of a communication on the diurnal inequalities from 1841–1857, printed in the Philosophical Transactions, 1863. With a note on the luno-diurnal and other lunar inequalities, as deduced from observations extending from 1848 to 1863. (Philos. Trans. Roy. Soc., 1869, pp. 413–414,) 4 plates. 4to. *London, 1869*

Discussion of the photographic records of the various magnetometers.

—See also 2750.

3382. **Akin,** C. K. Notes principally on thermo-electric currents of the Ritterian species. (Philos. Mag., Ser. IV, Vol. 27, pp. 383–384.) 8vo. *London, 1864*

A mathematical paper; reference to thermo-electric *inversion*, discovered by Professor Cumming.

—See also 1636.

3383. **Bradley,** L(everett). On the anthistometer. (Trans. Amer. Instit.; Proc. Polytech. Ass., 1864, pp. 447–453.) 1 plate. 8vo. *New York, (1864?)*

The anthistometer, a measure of resistance.

3384.——(E. A.) Hill's battery. (Trans. Amer. Instit.; Proc. Polytech. Ass. (1864?), pp. 453–454.) 8vo. *New York, (1864?)*

In this battery there is no porous metal, the liquids being kept apart by their density.

3385.——Galvanic batteries. Quantity and intensity currents. (Trans. Amer. Instit.; Proc. Polytech. Ass. (1864?), pp. 923–931.) 2 plates. 8vo. *New York, (1864?)*

Distinction between quantity and intensity currents.
—See also 1820, 3432, 3636.

3386. **Chautard,** J(ules Maria Augustin). Phenomena observed in the spectra produced by the light of induction-currents in traversing rarefied gases. (Philos. Mag., Ser. IV, Vol. 27, p. 408.) 8vo. *London, 1864*

Spectra of hydrogen, nitrogen, carbonic acid and bromine.
—See also 3531.

3387. **Clark,** (Josiah) Latimer. (1822–1898.) (Letter to Cyrus W(est) Field in reference to the Atlantic Cable of 1865.) *1864*
—See also 2897.

3388.—**Conte.** Ecole Impériale des Ponts et Chausées. Tunnel des Alpes. Conférences. 54 pp., 1 plate. 4to. (*Paris,*) *1864*
—See also 3340.

3389. **Crookes,** (Sir) William. The Atlantic cable and its teachings. (Quart. Journ. Sc., Vol. 1, pp. 44–53.) 8vo. *London, 1864*

Historical notice of the cable of 1858.
—See also 2420, 3496, 3821, 3994.

3390. **Culley,** R(ichard) S(pelman). On printing telegraphs. (Popul. Sc. Review, Vol. 3, pp. 293–303.) 8vo. *London, 1864*

Abbé Caselli's writing telegraph with a number of specimens.
—See also 1567, 4636.

3391. **Debus,** H(einrich). On the absorption and radiation of heat. (Popul. Sc. Review, Vol. 3, pp. 351–357.) 1 plate. 8vo. *London, 1864*

Account of Tyndall's researches and results.

3392. **De la Rive,** (Auguste Arthur). (1801–1873.) W. Thomson's method for measuring electrical conductivity.—Application to fused metals. (Philos. Mag., Ser. IV, Vol. 27, pp. 77–80.) 8vo. *London, 1864*

Conductivity of metals in the molten state.
—See also 2627.

3393. **Fairbairn,** (Sir) William. (1789–1874.) On the construction and mechanical properties of submarine telegraph cables. (Quart. Sc. Review, Vol. 1, pp. 624–642.) 8vo. *London, 1864*

Experiments to ascertain the insulating power of various substances proposed for cables.

3394. **Gaugain,** Jean M(othée). (1811–1880.) Note on the residual charge of electrical condensers. (Philos. Mag., Ser. IV, Vol. 28, pp. 76–78.) 8vo. *London, 1864*

The author concludes that the *residual charge* of condensers does not depend on absorption by the dielectric.
—See also 3129.

3395. **Gilmore,** Arthur, and (Sir) W(illiam) H(enry) **Preece.** A new ships' steering electric telegraph. 24 pp. ill. pl. 16mo. *London, 1864*

—See also 3556.

3396. **Gladstone,** J(ohn) H(all). (1827–1902.) Lighthouse illumination by magneto-electricity. (Quart. Journ. Sc., Vol. 1, pp. 70–75.) 8vo. *London, 1864*

History, merits and demerits of the system.
—See also 3180.

3397. **Gore,** George. On the electrical relations of metals, etc., in fused substances. (Philos. Mag., Ser. IV, Vol. 27, pp. 446–451.) 8vo. *London, 1864*

The most positive substances in fused salts are magnesium, aluminum and zinc; the most negative, platinum, gold, carbon and silver.
—See also 3022.

3398. **Hearder,** Jonathan N(ash). (1809–1876.) On a mode of preserving the iron plating of wooden ships from the corrosive action of sea water. 7 pp. 8vo. (*London,*) *1864*

The proposal is to attach a zinc band to the iron-plating which is kept a few inches from the copper-sheathing of the ship.
—See also 2916.

3399. **Hughes,** D(avid) E(dward). (1831–1900.) Expériences sur la forme et la nature des électro-aimants. (Ann. Télégr., 1864, pp. 1–11.) 2 plates. 8vo. *Paris, 1864*

Curves of magnetization obtained from magnets of various forms.
—See also 1361, 4018, 4230, 4272.

3400. **Jochmann,** E(mil Carl Gustav Georg). (1833–1871.) On the electric currents induced by a magnet in a rotating conductor. (Philos. Mag., Ser. IV, Vol. 27, pp. 506–528.) 1 plate. 8vo. *London, 1864*

Mathematical memoir on magnetism due to rotation.

3401.——On induction in a rotating conductor. (Philos. Mag., Ser. IV, Vol. 28, pp. 347–349.) 8vo. *London, 1864*

Integration of equations connected with currents due to the rotation of a conductor in a magnetic field.

3402. **Johnston,** John. (1806–1879.) On the electrical properties of pyroxyline-paper and gun-cotton. (Philos. Mag., Ser. IV, Vol. 27, p. 240.) 8vo. *London, 1864*

The author rubs sealing-wax, amber and sulphur with pyroxyline-paper and finds them to be *positively* electrified.

3403. **Malone,** T(homas) A. On the gas battery of Mr. Grove and its theory. (Philos. Mag., Ser. IV, Vol. 27, pp. 54–56.) 8vo. *London, 1864*

The writer dissents from the accepted theory of the "gas" battery.
—See also 3066.

3404. **Matthiessen,** A(ugustus) (1831–1870) and K(arl Christoph) **Vogt** (1817–1895). On the influence of temperature on the

electric conducting-power of alloys. (Philos. Trans. Roy. Soc., 1864, pp. 167–200.) 4to. *London, 1864*

Experimental data showing the influence of temperature on the conducting power of alloys composed of two and of three metals.

3404a.— —(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 27, pp. 467–469.) 8vo. *London, 1864*

—See also 3033, 3307, 3353.

3405. **Mauritius,** M. On the variation of magnetic force with the temperature. (Philos. Mag., Ser. IV, Vol. 27, pp. 398–400.) 8vo. *London, 1864*

The author concludes from his experiments that the magnetic properties of iron are developed suddenly at a determinate temperature.

3406. **Napier,** James (Robert). (1821–1879.) On the dynamics of the galvanic battery. (Philos. Mag., Ser. IV, Vol. 27, pp. 52–54.) 8vo. *London, 1864*

Criticism on the ionic theory of electrolysis.

3407. **Norton,** W(illiam) A(ugustus). (1810–1883.) On molecular physics. (Philos. Mag., Ser. IV, Vol. 28, pp. 425–433; Vol. 30, pp. 276–289.) 8vo. *London, 1864–1865*

—See also 2872.

3408. **Plantamour,** E(mile) (1815–1882), and A(dolph) **Hirsch** (1830–1901). Détermination télégraphique de la différence de longitude entre les observations de Genève et de Neuchâtel. (Mém. Soc. Phys., Genève, Vol. 17, pp. 289–436.) 4 plates. 4to. *Geneva, 1864*

Description of the method used (with full numerical details), in determining the difference of longitude between the observatories of Geneva and Neuchatel.

3409. **Plateau,** J(oseph Antoine Ferdinand). (1801–1883.) Sur un problème curieux de magnétisme. (Mém. Acad. Sc., Belgique, Vol. 34, pp. 1–37.) 4to. *Brussels, 1864*

The problem is: can an unsupported needle be maintained in stable equilibrium by the sole action of other magnets? The author was a very distinguished (Belgian) physicist.

3410. **Poggendorff,** J(ohann) C(hristian). (1796–1877.) On the extra current of the induction current. (Philos. Mag., Ser. IV, Vol. 28, pp. 1–8.) 8vo. *London, 1864*

—See also 2782.

3411. **Raoult,** F(rançois) M(arie). (1830–1901.) Researches into the thermal phenomena of voltameters, and measurements of the quantities of heat absorbed in electro-chemical decompositions. (Philos Mag., Ser. IV, Vol. 28, pp. 551–554.) 8vo. *London, 1864*

"A voltameter introduced into circuit weakens the electro-motive force and thus destroys in the complete circuit a quantity of heat which is always greater than what is required for the decomposition effected."

—See also 3359.

3412. **Riess,** P(eter Theophil). (1804–1883.) On the deflection of the magnetic needle by the secondary currents of the Leyden battery. (Philos. Mag., Ser. IV, Vol. 27, pp. 313–316.) 8vo.
London, 1864

The author describes a "powerful" means of imparting magnetism to a needle by using a Leyden battery.
—See also 3250.

3413. **Sabine,** (Sir) Edward. (1788–1883.) Results of hourly observations of the magnetic declination made by Sir Francis Leopold McClintock, and the officers of the yacht "Fox," at Port Kennedy, in the Arctic Sea, in the winter of 1858–1859; and a comparison of these results with those obtained by Captain Rochfort Maguire, and the officers of her Majesty's Ship "Plover," in 1852, 1853 and 1854, at Point Barrow. (Philos. Trans. Roy. Soc., 1864, pp. 649–663.) 1 plate. 4to.
London, 1864

Declinometer described; frequency of polar lights; solar-diurnal variation.

3414.——A comparison of the most notable disturbances of the magnetic declination in 1858 and 1859 at Kew and at Nertschinsk; preceded by a brief retrospective view of the progress of the investigation into the laws and causes of the magnetic disturbances. (Philos. Trans. Roy. Soc., 1864, pp. 227–245.) 4to.
London, 1864

Solar origin of the variations in terrestrial, magnetic phenomena; the decennial cycle.
—See also 2544.

3415. **Schmidt,** Gustav (Johann Leopold). (1826–1883.) Graphische Darstellung des Ohm'schen Gesetzes. 3 l. 8vo. *Leoben, 1864*

Graphs relating to the laws of Ohm and Joule.

3416. **Scoutetten,** (Robert Joseph) H(enri). (1799–1871.) Expériences nouvelles pour l'électricité du sang. (Extract, Comptes rendus, Acad. Sc., Vol. 62.) 20 pp. 8vo. *Paris, 1864*

Electro-physical paper in which the author attempts to measure the *e. m. f.* of the blood.
—See also 3365.

3417. **Secchi** (Angelo). (1818–1878.) On earth currents and their relation to electrical and magnetic phenomena. (Philos. Mag., Ser. IV, Vol. 28, pp. 140–145.) 8vo. *London, 1864*

Earth-currents observed on a line 52 kilometers in length, running from Rome to Anzio.
—See also 3147.

3418. **Selby,** W. B. Letter to W. P. Andrew on the importance and necessity of the establishment of the Euphrates route. 36 pp. 8vo. *London (1864)*

"If England is to hold her old place in the world, she must establish a railway by the Euphrates route," p. 6.

3419. **Smyth,** C(harles) Piazzi. (1819–1900.) Report read to the special meeting of Her Majesty's government board of visitors of the Royal Observatory, Edinburgh, on the 4th of November, 1864. 10 pp. 4to. *Edinburgh, 1864*
The Great Pyramid and our standards of weight and measure.
—See also 3368.

3420. **Soret,** J(acques) L(ouis). (1827–1890.) Verification of the law of electrolysis when external work is performed by the galvanic current. (Philos. Mag., Ser. IV, Vol. 28, p. 563.) 8vo. *London, 1864*
Experiments made by the author which confirm the electrolytic law.
—See also 1430.

3421. **Tomlinson,** Charles. (1808–1897.) Experiments on the electrical fly. (Philos. Mag., Ser. IV, Vol. 27, pp. 202–218.) 1 plate. 8vo. *London, 1864*
The *electrical fly,* due to Hamilton of Dublin, affords a good illustration of the effect of points; the paper contains much important matter in connection with the electrical action of pointed conductors. Experiments with the "fly" in air, in rarefied air, in liquid dielectrics.
—See also 948.

3422. **Vinchent,** J(ulien). (1822–1887.) Des lignes télégraphiques Belges en 1862 et 1863; situation, résultats et renseignments divers. 104 pp. 8vo. (*1864*)

3422a.— —Mémoire sur les lignes télégraphiques du Royaume de Belgique. (Extract, Mém. Soc. Ingen. Civils.) 40 pp. L. 8vo. *Paris, 1864*
Telegraphic equipment in Belgium.
—See also 3268.

3423. **Wallich,** G(eorge) C(harles). (1815–1899.) The deep-sea bed of the Atlantic and its inhabitants. (Quart. Journ. Sc., Ser. I, Vol. 1, pp. 36–44.) 8vo. *London, 1864*
—See also 3217.

3424. **Whipple,** G(eorge) M(athews). (1842–1893.) Results of meteorological observations at the Kew Observatory. (Intellectual Observer, Vol. 6, pp. 52–57+246–251; Vol. 9, pp. 293–298; Vol. 13, pp. 47–52.) 1 plate. 8vo. *London, 1864–1868*
Daily observations and diagrams.

3425. **Application** of electricity to Railway purposes. (Railway Engin., Vol. 5, pp. 161–165.) ill. 4to. *London, 1864*
Short notice of the Weston dynamo and the Maxim lamp.

3426. **Great** electro-magnet.—Chester's electropoin battery. (Trans. Amer. Instit.; Proc. Polytech. Ass., 1864, pp. 347–348.) 1 plate. *New York, 1864*
A zinc-carbon battery.

3427. **Report** of the Committee appointed by the British Association on Standards of electrical resistance. (Sir Charles) Wheatstone, (Alexander William) Williamson, C(romwell) F(leetwood) Varley, (Sir William) Thomson, Balfour Stewart, (Sir

Charles William) Siemens, A(ugustus) Matthiessen, (James Clerk) Maxwell, W. H. Miller, J(ames) P(rescott) Joule, (Henry Charles) Fleeming Jenkin, Esselbach, Sir (Charles) Bright.) (Report, British Ass. Adv. Sc., 1863, pp. 111–176.) 1 plate. 8vo. *London, 1864*

This memorable report deals with the measurements of magnetic phenomena by their electromagnetic effects, and electric phenomena by their statical effects. Theory of the spinning coil by James Clerk Maxwell.

—See also 3378.

3428. **Toronto** Magnetical Observatory. Results of meteorological observations made during the years 1860, 1861 and 1862 at the Toronto Magnetical Observatory. xxiii+84 pp. 4to. *Toronto, 1864*

The introduction contains general remarks on the work carried on in the Observatory, which was established in 1839.

3429. **Bacon,** G. W. Chart of the Atlantic telegraph, containing a history of telegraphy, origin and progress of the Atlantic telegraph, description of the old and new cables. 82 x 56 cm. *London (1865?)*

Picturesque map showing the submergence of the Atlantic cable.

3430. **Bezold,** W(ilhelm) von. (1837–1907.) On the electrical behaviour of solid insulators. (Philos. Mag., Ser. IV, Vol. 30, pp. 181–184.) 8vo. *London, 1865*

Note on dielectric absorption and residual discharge; "electrical movements can take place in the interior of insulators."

—See also 1482.

3431. **Blavier,** E(douard) E(rneste). (1826–1887.) Note sur la réponse de M. Guillemin aux observations de M. Gounelle. 45 pp. 8vo. *Nancy, 1865*

Controversial paper on the "velocity of electricity" law of duration of the variable period.

—See also 1381, 4258, 4290.

3432. **Bradley,** L(everett). Bradley's new telegraph magnet. (Trans. Amer. Instit.; Proc. Polytech. Ass., 1865, pp. 511–513.) 8vo. *New York, 1865*

Peculiarities and advantages claimed for the author's electro-magnet.

—See also 3383.

3433. **Bultinck,** M. Use of magnesium as electro-motor metal in voltaic elements. (Philos. Mag., Ser. IV, Vol. 30, p. 390.) 8vo. *London, 1865*

3434. **Bunsen,** R(obert Wilhelm). (1811–1899.) On some thermo-electric piles of great activity. (Philos. Mag., Ser. IV, Vol. 29, pp. 159–162.) 8vo. *London, 1865*

Inquiry into the generation of the electric current in thermo-electric batteries by the distinguished chemist and inventor of the Bunsen primary battery.

3435. **Burt,** T. Seymour. Observations for consideration previously to the laying of another Atlantic cable. (Journ. Soc. Arts, Vol. 14, pp. 87–88.) 8vo. *London, 1865*

3436. **Chase,** Pliny Earle. On numerical relations of gravity and magnetism. (Philos. Mag., Ser. IV, Vol. 30, pp. 52–57.) 8vo. *London, 1865*

Hansteen suspected and Sabine demonstrated the influence of the sun on terrestrial magnetism; the writer holds that all the phenomena of terrestrial magnetism result from tidal and thermal changes in terrestrial variation.

3436a.— —(The same paper.) (Trans. Amer. Philos. Soc., Vol. 13, pp. 117–136.) 4to. *Philadelphia, 1869*

3437.— —Influence of gravity on magnetic declination. (Philos. Mag., Ser. IV, Vol. 30, pp. 185–191.) 8vo. *London, 1865*

The author finds a distinct connection between the daily and annual variations of terrestrial magnetism and gravitation.

3438.— —On gravity and magnetic inclination. (Philos. Mag., Ser. IV, Vol. 30, pp. 329–336.) 8vo. *London, 1865*

Some relations found by the author between gravitation-currents and magnetic dip.

3439. **Clark,** (Josiah) Latimer. (1822–1898.) (Letter to George Saward on the cable of 1865.) *1865*

—See also 2897.

3440. **Crace-Calvert,** F(rederick) (1819–1873) and Richard **Johnson** (1810?–1881.) On the action of sea-water upon certain metals and alloys. (Extract, Journ. Soc. Arts, 1865.) 3 pp. 8vo. *London, 1865*

The conclusion reached is: that iron is materially preserved from the action of sea-water when coated with zinc.

—See also 3083.

3441. **De la Rive,** A(uguste Arthur). (1801–1873.) Note on the propagation of electricity through metallic vapours produced by the voltaic arc. (Philos. Mag., Ser. IV, Vol. 29, pp. 553–554.) 8vo. *London, 1865*

3442.— —On the optical properties developed in different kinds of glass by the passage of an electric discharge. (Philos. Mag., Ser. IV, Vol. 30, p. 180.) 8vo. *London, 1865*

Note on the rotatory magnetic power of crown, flint and heavy (Faraday) glass.

—See also 2627.

3443. **Ellis,** William. Lecture on the Greenwich system of time signals. (Horological Journ., Vol. 7, pp. 85–92+97–102+109–114+121–124.) 8vo. *London, 1865*

Time signals are automatically transmitted from a clock in the Observatory at Greenwich to different centres of London whence they are distributed throughout the country.

—See also 3344.

3444. **Evans,** (Sir) Frederic John (Owen) (1816–1886) and A(rchibald) **Smith** (1813–1872). On the magnetic character of the armour-plated ships of the Royal Navy, and on the effect on

the compass of particular arrangements of iron in a ship. (Philos. Trans. Roy. Soc., 1865, pp. 263–323.) 2 plates. 4to. *London, 1865*

Revision of the mathematical theory of the deviations of the compass and practical methods of compensation.

—See also 3318, 3543.

3445. **Faraday,** Michael. (1791–1867.) On the diamagnetic conditions of flame and gases (Philos. Mag., Ser. IV, Vol. 31, pp. 401–421.) 8vo. *London, 1865*

Account of Bancalar's discovery by Zantedeschi with remarks and confirmatory experiments by Faraday.

—See also 2549.

3446. **Fernet,** E(mile). Phenomenon in the induction-spark. (Philos. Mag., Ser. IV, Vol. 29, p. 550.) 8vo. *London, 1865*

Effect of heat on the path of spark from induction coil.

3447. **Flight,** Walter. (1845?–1885.) On the thermo-electric tension of minerals. (Philos. Mag., Ser. IV, Vol. 30, pp. 337–339.) 8vo. *London, 1865*

List of minerals used with results obtained.

3448. **Gervais,** Paul. Application of the electric light (Geissler's tubes) for lighting under water. (Philos. Mag., Ser. IV, Vol. 29, p. 55.) 8vo. *London, 1865*

Description of apparatus devised by the author and constructed by Ruhmkorff.

3449. **Gisborne,** Francis. Statistics of submarine telegraph cables to April, 1865. 4 l. Folio. *London, 1865*

Length, weight, depth and life of 68 submarine cables.

3449bis. **Halse,** W(illiam) H(ooper). On the extraordinary remedial efficacy of medical galvanism, when scientifically administered. 37 pp. 12mo. *London, (1865)*

Special ailments enumerated for which application of the electric current is effective.

3450. **Hansteen,** Chr(istopher). (1784–1873.) Observations de l'inclinaison magnétique, faites pendant les années 1855 à 1864 à l'observatoire de Christiania. (Extract, Bull. Acad. Belgique, Ser. II, Vol. 18.) 16 pp. 8vo. (*Brussels, 1865?*)

Tabulated observations of magnetic dip.

—See also 2575bis.

3451. **Hearder,** Jonathan N(ash). (1809–1876.) Some remarks on the cost of the light from magnesium as compared with other sources of illumination, with an account of some new inflammable and explosive compounds of magnesium. 3 pp. 8vo. *1865*

—See also 2916.

3452. **Holtz,** (Wilhelm Theodor Bernhard.) Ueber eine neue Elektrisiermaschine. (Ann. Phys. und Chem., Vol. 126, pp. 157–171.) 1 plate. 8vo. *Berlin, 1865*

A modified form of the Holtz machine.

3452a.——(English translation.) On an electrical induction machine.—On a new electrical machine. Translated by Prof. Poggendorff. (Philos. Mag., Ser. IV, Vol. 30, pp. 159–160+425–433.) 1 plate. 8vo. *London, 1865*

—See also 1982.

3453. **Hough,** G. W. Automatic registering and printing barometer. (Trans. Amer. Instit.; Proc. Polytech. Ass., 1865, pp. 460–468.) 3 plates. 8vo. *New York, 1865*

3454. **Jenkin,** (Henry Charles) Fleeming. (1833–1885.) Letter addressed to the Editors of the Philosophical Magazine and Journal on electrical standard. (Philos. Mag., Ser. IV, Vol. 29, p. 248.) 8vo. *London, 1865*

The author announces that the B. A. unit of resistance is ready for distribution.

3455.——On the retardation of electrical signals on land lines. (Philos. Mag., Ser. IV, Vol. 29, pp. 409–421.) 1 plate. 8vo *London, 1865*

The author applies to aerial lines the mathematical theory of electric transmission through submarine cables.

3456.——Report on the new unit of electrical resistance proposed and issued by the Committee on electrical standards appointed in 1861 by the British Association. (Philos. Mag., Ser. IV, Vol. 29, pp. 477–486.) 8vo. *London, 1865*

Meaning of the term *electrical resistance;* views held by early physicists; table of relative values of various units.

3456a.——(The same paper.) (Proc. Roy. Soc., Vol. 14, pp. 154–164.) 8vo. *London, 1865*

—See also 3137.

3457. **Knochenhauer,** K(arl) W(ilhelm). (1805–1875.) Ueber die Theilung des Batteriestromes nach dem Galvanometer. (Ann. Phys. und Chem., Vol. 126, pp. 228–264.) 1 plate. 8vo. *Berlin, 1865*

Division of current in certain galvanometers, *e. g.* Gaugain's.

—See also 1234.

3458. **Lloyd,** Humphrey. (1800–1881.) Observations made at the magnetical and meteorological observatory at Trinity College, Dublin. Vol. 1, 1840–1843.) 7 plates. 4to. *Dublin, 1865*

Description of methods for determining the three magnetic elements followed by the daily magnetometer readings from 1840 to 1843.

—See also 2726.

3459. **Loomis,** Elias. (1811–1889.) The aurora borealis, or polar light, its phenomena and laws. (Smithsonian Report, 1865, pp. 208–248) ill. 8vo. *Washington, 1865*

—See also 2866.

3460. **Marcus,** M. S. On a new thermo-element. (Philos. Mag., Ser. IV, Vol. 29, p. 206.) 8vo. *London, 1865*

A new electric element; the positive metal is an alloy of copper, zinc and nickel; the negative, an alloy of antimony, zinc and bismuth.

3461. **Matteucci,** Carlo. (1811–1868.) On the electricity of the torpedo. (Philos. Mag., Ser. IV, Vol. 30, pp. 453–455.) 8vo. *London, 1865*

Relation between the function of the nerves and electricity.
—See also 2728.

3462. **Matthiessen,** A(ugustus). (1831–1870.) On the specific resistance of the metals in terms of the B. A. Unit (1864) of electric resistance, together with some remarks on the so-called mercury unit. (Philos. Mag., Ser. IV, Vol. 29, pp. 361–370.) 8vo. *London, 1865*

Tables of the resistance of certain metals and alloys in terms of the B. A. unit; general considerations on physical constants, especially the electrical units.
—See also 3033.

3463. **Maxwell,** J(ames Clerk). (1831–1879.) A dynamical theory of the electro-magnetic field. (Philos. Trans. Roy. Soc., 1865, pp. 459–512.) 4to. *London, 1865*

One of the author's great contributions to electrical theory; electromagnetic moment of a current; coefficients of induction of two currents and how determined; mechanical actions in a magnetic field.

3463a.——(The same paper.) Abstract. (Philos. Mag., Ser. IV, Vol. 29, pp. 152–157.) 8vo. *London, 1865*
—See also 3034.

3464. **Maxwell,** J(ames Clerk) (1831–1879) & (Henry Charles) Fleeming **Jenkin.** (1833–1885.) On the elementary relations between electrical measurements. (Philos. Mag., Ser. IV, Vol. 29, pp. 436–460+507–525.) 8vo. *London, 1865*

Papers of fundamental importance on electric, magnetic and electro-magnetic terms.
—See also 3034, 3137.

3465. **Melsens,** (Louis Henri Frédéric.) (1814–1886.) Sur les paratonnerres et sur quelques expériences faites avec l'étincelle d'induction et les batteries de Leyde. (Bull. Acad. Sc., Belgique, Ser. II, Vol. 20, pp. 15–24.) 8vo. *Brussels, 1865*

The pamphlet contains some of the author's views on lightning conductors and the manner in which he intended to carry them out for the protection of the Brussels Hotel de Ville.
—See also 2040, 3606, 3883, 4186.

3466. **Menzzer,** (Karl Ludwig.) Relation of the weight of a magnetizing spiral and the magnetizing force. (Philos. Mag., Ser. IV, Vol. 30, pp. 457–458.) 8vo. *London, 1865*

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—See also 3248.

3468. **Pèlegrin,** A., & A. **Garbeiron.** Le cable léger. 16 pp. 8vo. *Limoges, 1865*

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The horizontal component of the earth's magnetic force in absolute measure.
—See also 912.

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The author finds that sulphur, being less hygroscopic than glass, can be usefully employed in constructing plate machines.

3471. **Sabine,** (Sir) Edward (1788–1883), & T. H. **Farrer.** Correspondence between the President and Council of the Royal Society and the Board of Trade on the magnetism of ships, and on the meteorological department. (From Proc. Roy. Soc., Vol. 14, pp. 300–317.) 22 pp. 8vo. *London, 1865*
—See also 2544.

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Apparatus by which small heating-effects of the glass in Leyden-jar discharges may be recognized.
—See also 3259.

3473. **Thomson,** J. Atlantic telegraph cable machinery on board the Great Eastern, 1865–66. 9 plates. (Photographs.) Squ. folio. *1865–1866*

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—See also 2811.

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—See also 1757, 3590, 3653, 3676, 4051.

3476. **Waterston,** John J(ames). An account of some electrical experiments and inductions. (Philos. Mag. Ser. IV, Vol. 29, pp. 81–98+192–205+370–373.) 1 plate. 8vo. *London, 1865*

Experiments bearing on the law of electric force in space; discharging influence of points, flames and incandescent matter.

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—See also 3157.

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—See also 3219.

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3480.——Thoughts on matter and force. (Trans. Acad. Sc., St. Louis, 1865, pp. 299–310.) 8vo. *St. Louis, 1865*

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Notes of lectures on electric telegraphy.

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Sir Charles Bright and the electoral Borough of Greenwich (1865).
—See also 4427.

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—See also 3378.

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—See also 995, 4996, 4998.

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—See also 2018, 3714, 3917, 3989.

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—See also 1738, 3533, 3660.

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—See also 3573, 3770, 3780, 4162.

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—See also 4222.

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—See also 3191.

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—See also 3311.

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—See also 3259.

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—See also 3149.

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—See also 1778.

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3528. **Newspaper** cuttings. Folio. *1866–1885*

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3535. ——Transport of a body by the voltaic current and by induction currents. (Philos. Mag., Ser. IV, Vol. 33, pp. 482–484.) 8vo. *London, 1867*

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—See also 3500.

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—See also 2138, 3318, 3444, 3577, 3662, 3688.

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—See also 3129.

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—See also 1614, 4758, 5364, 5549, 5557, 5561, 5567, 5604.

3547. **Karmarsch,** Karl. Ueber Drahtlehren. (Zeitschr. Verein Deutsch. Ingen., Vol. 11, pp. 409–414+467–471+665–667+893–896.) 4to. *Berlin, 1867*

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—See also 4932.

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—See also 3191.

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—See also 3034.

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—See also 5384.

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A. B. unit of resistance.

—See also 1496, 3395, 3737, 3837, 3887, 3962, 4029, 4099, 4142, 4162, 4192, 4233, 4318, 4330, 4358, 5028, 5411, 5417, 5464, 5490.

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Practical observations on the construction of induction-coils for the purpose of increasing the heating power of the discharge.

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—See also 3144.

3560. **Schaw, H.** Notes on the electric telegraph. 63+40 pp.+Appendix on the ignition of gunpowder by electricity. 14 pp. ill. Folio. (*London, 1867?*)
The B. A. definition of electric and magnetic quantities; batteries and various apparatus used in signaling.

3561. **Schwendler,** (Carl) Louis. (1838–1882.) On testing telegraph cables during the process of sheathing. (Philos. Mag., Ser. IV, Vol. 34, pp. 169–177.) 8vo. *London, 1867*
Theory of the method proposed by the author, an electrician of ability.
—See also 3516.

3562. **Siemens,** (Sir) C(harles) William. (1822–1883.) On the conversion of dynamical into electrical force without the aid of permanent magnetism. (Proc. Roy. Soc., Vol. 15, pp. 367–369.) 8vo. *London, 1867*
This paper is remarkable for the introduction of the cumulative principle in the generation of powerful currents. The paper is dated Febr. 4, 1867, whilst that of Wheatstone announcing the same is dated Febr. 14. (See No. 3570.)

3562a.— —(The same paper.) (Philos. Mag., Ser. IV, Vol. 33, pp. 469–471.) 8vo. *London, 1867*

3563.— —On a resistance measurer. (Philos. Mag., Ser. IV, Vol. 34, pp. 270–273.) 8vo. *London, 1867*
The instrument is said to be equal to the "bridge" in accuracy and range for measuring the resistance of electric conductors.
—See also 3107.

3564. **Siemens,** (Ernst) Werner. (1816–1892.) The automatic telegraph system for the Indo-European Line. 20 pp. 3 plates. 4to. (Manuscript translation.) *1867*
The automatic telegraph system which the author devised for a contemplated Indo-European line.
—See also 3259.

3565. **Thomson,** (Sir) William. (Lord Kelvin). (1824–1907.) On self-acting apparatus for multiplying and maintaining electric charges, with applications to illustrate the voltaic theory. (Philos. Mag., Ser. IV, Vol. 34, pp. 391–396.) 8vo.
London, 1867
Experiments with water-drops and metallic filings falling through funnels (inductors) into insulated cans (receivers) thereby building up strong charges.
—See also 2946.

3566. **Tresca,** (Henri Edouard). (1814–1885.) Sur le frein à embrayage électrique pour waggons de chemins de fer. 14 pp. 4to. *Paris, 1867*
Note on the author's electric brake for use on trains.
—See also 1342.

3567. **Varley,** Cromwell F(leetwood). (1828–1883.) On certain points in the theory of magneto-electric machines of Wilde, Wheatstone and Siemens. (Philos. Mag., Ser. IV, Vol. 33, pp. 543–544.) 8vo. *London, 1867*
The remarks refer principally to the employment of shunts.
—See also 3372.

3568. **Webb,** F(rederick) C(harles). (1828–1899.) On one of Ohm's laws relating to an insulated circuit. (Philos. Mag., Ser. IV, Vol. 33, pp. 321–325.) 8vo. *London, 1867*
The problem relates to the alteration in the distribution of the tensions in a closed insulated circuit with one point connected to an insulated conductor.
—See also 3111.

3569. **Weyde,** (P. H.) van der. (1813–1895.) Holtz's revolving electrophorous. (Trans. Amer. Instit.; Proc. Polytech. Ass., 1867, p. 970.) 8vo. *New York, 1867*
Principle and construction of the Holtz (influence) machine.
—See also 3267.

3570. **Wheatstone,** (Sir) Charles. (1802–1875.) On the augmentation of the power of a magnet by the reaction thereon of currents induced by the magnet itself. (Proc. Roy. Soc., Vol. 15, pp. 369–372.) 8vo. *London, 1867*
The cumulative principle in the production of powerful currents clearly enunciated. The paper is dated Febr. 14, 1867; that of Siemens on the same subject is dated Febr. 4, 1867. (See No. 3562.)

3570a.——(The same paper.) (Philos. Mag., Ser. IV, Vol. 33, pp. 471–474.) 8vo. *London, 1867*
—See also 2585.

3571. **Instruction** sur les paratonnerres des magasins à poudre du Louvre et des Tuileries. (Comptes rendus Acad. Sc., Vol. 64, pp. 102–117.) 1 plate. 4to. *Paris, 1867*
This document on the protection of powder-magazines against lightning is signed by Regnault, Pouillet, Fizeau and Becquerel.

3572. **On the** ignition of gunpowder by electricity. 14 pp. ill. Folio. (*London, 1867?*)
Three methods of firing powder: the voltaic battery, the magnetic exploder and the electric spark.

3573. **Report** of the Committee on Standards of Electrical Resistance. (Alexander Williams) Williamson, (Sir) C(harles) Wheatstone, (Sir) W(illiam) Thomson, W. H. Miller, A(ugustus) Matthiessen, (Henry Charles) Fleeming Jenkin, (Sir) Charles Bright, (James Clerk) Maxwell, (Sir) W(illiam) Siemens, Balfour Stewart, C(romwell) F(leetwood) Varley, G(eorge)

C(arey) Foster, (Josiah) Latimer Clark, (James David) Forbes, Charles Hockin and (James Prescott) Joule.) (Report, British Ass. Adv. Sc., 1867, pp. 474–522.) 2 plates. 8vo. *London, 1868*

Sir William Thomson on electrometer and Dr. Joule on the determination of the dynamical equivalent of heat from thermal effects of electric current.
—See also 3378.

3574. **Airy,** (Sir) George Biddell. (1801–1892.) Comparison of magnetic disturbances recorded by the self-registering magnetometers at the Royal Observatory, Greenwich, with magnetic disturbances deduced from the corresponding terrestrial galvanic currents recorded by the self-registering galvanometers of the Royal Observatory. (Philos. Trans. Roy. Soc., 1867, pp. 465–472.) 6 plates. 4to. *London, 1868*

It is concluded that earth-currents are insufficient to explain the earth's general magnetism.
—See also 2750.

3575. **Clark,** (Josiah) Latimer. (1822–1898.) Pneumatic communication between railway passengers, guards, and engine drivers. 13 pp. 1 plate & ill. 12mo. *London, 1868*
—See also 2897.

3576. **Edlund,** E(rik). (1819–1888.) On the least electromotive force by which a galvanic luminous arc can be produced. (Philos. Mag., Ser. IV, Vol. 35, pp. 441–448.) 8vo. *London, 1868*

Conduction in the arc is mainly effected by the transfer of material particles.
—See also 3500.

3577. **Evans,** (Sir) Frederic John (Owen). (1816–1886.) On the amount and changes of the polar magnetism at certain positions in Her Majesty's iron-built and armour-plated ship Northumberland. (Philos. Trans. Roy. Soc., 1868, pp. 487–503.) 2 plates. 4to. *London, 1868*

Practical deductions for use in the Royal Navy from numerous observations tabulated in the paper.
—See also 3543.

3578. **Gisborne,** F(rederick) N(ewton). (1821–1892.) Origin of the Atlantic cable. Correspondence (with Cyrus W. Field and others.) 4 pp. Folio. *London, 1868*

3579.——Telegraphic communication with India. 16 pp. 1 map. 8vo. *London, 1868*

Necessity of adding new lines to the Indian telegraph service.
—See also 4223, 5322.

3580. **Gore,** G(eorge). On the relation of mechanical strain of iron to magneto-electric induction. (Philos. Mag., Ser. IV, Vol. 36, pp. 446–447.) 8vo. *London, 1868*
—See also 3022.

3581. **Govi,** G(ilberto). (1826–1889.) Volta e la telegrafia elettrica, ricerche storiche. 14 pp. 8vo. *Turin, 1868*
It is claimed that Volta by the invention of his battery may be considered the *father of electric telegraphy.*
—See also 1744.

3582. **Kohlrausch,** F(riedrich Wilhelm Georg). Ueber die von der Influenzmaschine erzeugte Elektricitaetsmenge nach absolutem Maasse. (Ann. Phys. und Chem., Vol. 135, pp. 120–125.) 8vo. *Berlin, 1868*
The current from influence machines estimated in absolute measure.
—See also 3548.

3583. **(Lacoine,** Emile). Télégraphie Ottomane-note sur quelques instruments télégraphiques imaginés en Turquie. 16 pp. 8vo. *Constantinople, 1868*
Proposed improvement in Professor Hughes's printing telegraph.
—See also 1871, 3641, 3787.

3584. **Le Roux,** F(rançois) P(ierre). Les machines magnéto-électriques françaises et l'application de l'électricité à l'éclairage des phares. (Extract, Bull. Soc. d'Encour. Instit. Nat., 1867.) 78 pp. 2 plates and ill. 4to. *Paris, 1868*
Electric light as produced by the magneto machines of the *Alliance Company.*
—See also 3191.

3585. **Littrow,** (Karl Ludwig) von. (1811–1877.) Instructions sur l'usage et la précision des méthodes pour trouver la longitude et la variation du compas par des hautes circumméridiennes. 14 pp. 8vo. *Vienna, 1868*
Suggestions for the use of seamen on the determination of the variation of the compass by circum-meridan altitudes of the sun and stars.

3586. **Lovering,** Joseph. I. Catalogue of auroras observed mostly at Cambridge after the year 1838. II. On the periodicity of the aurora borealis. (Mem. Amer. Acad. Sc., N. S., Vol. 10, pp. 1–351.) 4to. *Cambridge, 1868*
The memoir on the periodicity of the aurora borealis contains a discussion of all available observations.

3586a.——On the periodicity of the aurora borealis. (Proc. Amer. Acad. Sc., N. S., Vol. 8, pp. 55–58.) 8vo. *Cambridge, 1868*
—See also 3138.

3587. **Maxwell,** J(ames) Clerk. (1831–1879.) On a method of making a direct comparison of electrostatic with electro-magnetic force; with a note on the electro-magnetic theory of light. (Philos. Trans. Roy. Soc., 1868, pp. 643–657.) 4to. *London, 1868*
The electrostatic force observed was that between two parallel discs; the electromagnetic was the repulsion between two circular coils; v was found to be 288,000,000 metres per second.
—See also 3034.

3588. **Medhurst,** J. W. The elements of electric science. (World of Science, Vol. 2, pp. 47–48.) Folio. *London, 1868*

3589. **Sabine,** (Sir) Edward. (1788–1883.) Contributions to terrestrial magnetism. No. 11. (Philos. Trans. Roy. Soc., 1868, pp. 371–416.) 3 plates. 4to. *London, 1868*
History of the magnetic survey of the South Polar Regions corresponding to the epoch 1840-1845 with maps.
—See also 2544.

3590. **Waltenhofen,** A(dalbert Carl) von. Ueber eine neue Methode die Widerstaende galvanischer Ketten zu messen. (Ann. Phys. und Chem., Vol. 134, pp. 218–249.) 8vo. *Berlin, 1868*
Modified form of Poggendorff's compensation method.

3590a.— —(English translation.) On a new method of determining the resistance of galvanic circuits. (Abstract.) (Philos. Mag., Ser. IV, Vol. 34, pp. 77–78.) 8vo. *London, 1867*
—See also 3475.

3591. **Warren,** Thomas T. P. Bruce. Testing telegraph-cables. (Reprinted, Engineering, Vol. 5.) 2 pp. 8vo. *London, 1868*
Note on the author's "continuity test" between ship and shore.
—See also 1758, 3707, 3747, 3767, 4465.

3592. **Waszmuth,** Anton. Ueber die Stroeme in Nebenschliessungen zusammengesetzter Ketten. (Sitz. Ber. Akad. Wiss. Math. Nat. Kl., Vol. 57, pp. 47–55.) 8vo. *Vienna, 1868*
Resistance due to variations in battery combinations.

3593. **Webb,** F(rederick) C(harles). (1828–1899.) On inductive circuits, or the application of Ohm's law to problems of electrostatics. (Philos. Mag., Ser. IV, Vol. 35, pp. 325–333.) ill. 8vo. *London, 1868*
Leyden jars in series and in parallel.
—See also 3111.

3594. **Abel,** (Sir) F(rederic Augustus). (1827–1902.) On some applications of electricity to naval and military purposes. (Proc. Roy. Instit., Vol. 5, pp. 479–495.) 8vo. *London, 1869*
The use of static electrical machines, induction coils, dynamos for firing mines and torpedoes in coast defence.
—See also 2308, 3751, 4025, 5411.

3595. **Airy,** (Sir) George Biddell. (1801–1892.) Syllabus of lectures on magnetism. 30 pp. 8vo. *London, 1869*
The thirteen lectures include the phenomena of terrestrial magnetism and the correction of compasses in iron-built ships.
—See also 2750.

3596. **Bolton,** (Frank). Extract from Report from the Ordnance Select Committee on the subject for inventions in military telegraphy. 3 pp. 4to. *London, 1869*
Captain Bolton's use of the electric light for military purposes.
—See also 3635, 4114, 4451, 4488.

3597. **Bridgman,** W. Kencely. Theory of the voltaic pile. (Philos. Mag., Ser. IV, Vol. 38, pp. 377–382.) 8vo. *London, 1869*
Objections against accepted theories of the voltaic cell.

3598. **Cazin,** A(chille Auguste). (1832–1877.) Recherches sur les courants interromptus. (Ann. Chim. et Phys., Ser. IV, Vol. 17, pp. 385–428.) 8vo. *London, 1869*

Remarks on Helmholtz's equation for current-strength during the variable period.

—See also 3336.

3599. **Challis,** (James). (1803–1882.) Note on the hydrodynamical theory of magnetism. (Philos. Mag., Ser. IV, Vol. 38, pp. 42–51.) 8vo. *London, 1869*

It is contended that the facts of magnetism "admit of explanation on the supposition that a single fluid (the ether) acts in a manner conformable to hydrodynamical principles."

—See also 3123.

3600. **Clark,** Edwin. (1814–1894.) On engineering philosophy; the durability of materials, with an abstract of the discussions upon the paper, edited by James Forrest. (Excerpt Minutes Proc. Instit. Civil Engin., Vol. 27.) 29+7 pp. 8vo. *London, 1869*

A passing reference to the durability of gutta-percha, p. 11.

—See also 2972.

3601. **Clark,** (Josiah) Latimer. (1822–1898.) On the Birmingham wire-gauge. 20 pp. 1 plate and 1 table. 8vo. *London, 1869*

Extension of the paper read at the Dundee meeting of the British Association with numerous tables. (See No. 3532.)

—See also 2897.

3602. **Gioble,** Pio. Intorno a un nuovo fotometro. Lettera al ch. sig. Prof. Paolo Volpicelli. (Extract, Giornale Arcadio, N. S., Vol. 60.) 4 pp. 8vo. *Rome, (1869?)*

Note on the author's photometer.

3603. **Kohlrausch,** F(riedrich Wilhelm Georg). Bestimmung der absoluten horizontalen Intensitaet des Erdmagnetismus durch Strommessung. (Ann. Phys. und Chem., Vol. 138, pp. 1–10.) 1 plate. 8vo. *Berlin, 1869*

Note on the author's method of determining the horizontal component of the earth's magnetic force in absolute measure.

—See also 3548.

3604. **Kohlrausch,** F(riedrich Wilhelm Georg & W(ilhelm) A(ugust) **Nippoldt.** Ueber die Gueltigkeit der Ohm'schen Gesetze fuer Elektrolyte und eine numerische Bestimmung des Leitungswiderstandes der verduennten Schwefelsaeure durch alternierende Stroeme. (Ann. Phys. und Chem., Vol. 138, pp. 280–390.) 8vo. *Berlin, 1869*

Verification of Ohm's law for liquids, alternating current used.

—See also 3548.

3605. **L.....,** H. A. Sub-marine telegraph cable to India and Australia considered as being the most direct, expeditious and secure line of communication, free from end to end of all

foreign political complications and compared with existing land lines. 25 pp. 1 map. 8vo. *London, 1869*
Difficulties of land lines compared with those of submarine cables.

3606. **Melsens,** (Louis Henri Frédéric). (1814–1886.) Notice sur le coup de foudre de la gare d'Anvers du 10 Juillet, 1865. (Bull. Acad. Sc., Belgique, Vol. 26.) 16 pp. (Incomplete.) 8vo. *Brussels, 1869*
The pamphlet contains a discussion of numerous cases of buildings struck by lightning.
—See also 3465.

3607. **Militzer,** Hermann. Ueber die Bestimmung der Constanten eines galvanischen Elementes. (Sitz. Ber. Akad. Wiss. Math. Nat. Kl., Vol. 59, pp. 472–480.) 8vo. *Vienna, 1869*
Note on a method of comparing the *e. m. f.* of batteries.
—See also 3248.

3608. **Moody,** John. Floating electric telegraph stations and light-ships for mid-ocean and the English and other channels. 8 pp. 1 plate. 8vo. *London, 1869*
"I am confident the mid-ocean and mid-channel stations would prove most remunerative."

3609. **Pepper,** John Henry. (1821–1900.) Some experiments with the great induction coil at the Royal Polytechnic. (Proc. Roy. Soc., Vol. 18, pp. 65–72.) 8vo. *London, 1869*
Details of construction of the great "Polytechnic" coil; the "flaming spark."
—See also 1528.

3610. **Poggendorff,** (Johann Christian). (1796–1877.) Ueber eine Vereinfachung in der Konstruktion und dem Gebrauch der Holtz'schen Influenzmaschine erster Art. (Sitz. Ber. Akad. Wiss. Math. Nat. Kl., Vol. 59, pp. 322–332.) 8vo. *Berlin, 1869*
Remarks on the construction and use of the Holtz machine.
—See also 2782.

3611. **Rokeby.** Results of magnetical observations made at Ascension Island, July, 1863 to March, 1866. (Proc. Roy. Soc., Vol. 17, pp. 397–400.) 8vo. *London, 1869*
The observations were reduced by Mr. Whipple of the Kew Observatory.

3612. **Slack,** Henry J(ames). (1818–1896.) The lightning's autograph. (Student's and Intellectual Observers, Vol. 4, pp. 369–371.) 1 plate. 8vo. *London, 1869*
An elm-tree struck by lightning.

3613. **Thomson,** (Sir) William. (Lord Kelvin.) (1824–1907.) Of geological dynamics. (Reprinted, Trans. Geolog. Soc., Glasgow, Vol. 3.) 26 pp. 8vo. *Glasgow, (1869?)*
Reply to Professor Huxley; also origin and total amount of plutonic energy. (Autograph copy.)
—See also 2946.

3614. **V.....,** J. La nouvelle loi des télégraphes en Angleterre. (Extract, Ann. Trav. Publics, Belgique, Vol. 26.) 93 pp. 8vo. *Brussels, 1869*
Law authorizing the purchase of telegraph lines by the British Government.
—See also 3651.

3615. **Varley,** Cromwell F(leetwood). (1828–1883.) On the Atlantic telegraph. (Proc. Roy. Instit., Vol. 5, pp. 45–59.) 8vo. *London, 1869*

Illustration of the effects of the "electrification" of a cable.

3616.— —Spiritualism. 1 p. Folio. (*London*), *1869*

Letter on spiritualistic phenomena in general.

—See also 3372.

3617. **Villari,** E(milio). (1836–1904.) Sulla forza elettro-motrice del palladio delle pile a gas. (Rendiconti Instit. Lombardo, Vol. 2, pp. 1085–1093.) 8vo. *Milan, 1869*

The author investigates the *e. m. f.* of gas-batteries with electrodes of platinum and palladium.

—See also 3521.

3618. **Electric** Telegraph School of Instruction. Circular. 3 pp. 4to. *London, 1869*

3619. **Invention** of the electric telegraph. The charge against Sir Charles Wheatstone of "Tampering with the press" as evidenced by a letter of the editor of the "Quarterly Review" in 1855. (Reprinted, Scient. Review.) vi+44 pp. 8vo. *London, 1869*

Two general articles on the Cooke-Wheatstone controversy.

3620. **(Persian** Gulf Cable.) A log book and memoranda in writing. *1869*

Operations connected with the submersion of the second Persian Gulf Cable, 1869, of which Latimer Clark was engineer-in-chief.

3621. **The second** Persian Gulf cable and Latimer Clark. (Bombay Gazette, Oct., 1869.) *1869*

3622. **The post-office** telegraphs and how they will work. By an electrician. 32 pp. 12mo. *Edinburgh, 1869*

Acquisition of telegraphs by government; considerations on general economics.

3623. **Stonyhurst** College Observatory. Results of meteorological and magnetical observations for 1869. 30 pp. 1 table. 12mo. *Preston, 1869*

3624. **Telegraph** to India. Discussion in the Times of December 3rd, 4th, 5th, 7th and 8th, 1869. 16 pp. 8vo. *London, 1869*

Letter by C. W. Siemens and Sir James Anderson.

3625. **European** and Indian Junction Telegraph Company, uniting Europe with India and Central Asia via Seleucia, the Euphrates Valley, the Persian Gulf and Kurachee. Map. 33x65 cm. (*London, 186?*)

—See also 4673.

3626. **Airy,** (Sir) G(eorge) B(iddell). (1801–1892.) Note on an extension of the comparison of magnetic disturbances with magnetic effects inferred from observed terrestrial galvanic currents; and discussion of the magnetic effects inferred from

the galvanic currents on days of tranquil magnetism. (Philos. Trans. Roy. Soc., 1870, pp. 215–226.) 1 plate. 4to.
London, 1870
Curves showing the diurnal inequalities of terrestrial magnetism.
—See also 2750.

3627. **Becquerel,** (Antoine César). (1788–1878.) Mémoire sur les effets chimiques produits dans les espaces capillaires. (Mém. Acad. Sc. Instit. France, Vol. 36, pp. 191–227.) 4to. *Paris, 1870*
Electro-capillary phenomena.

3628.— —Second mémoire: (The same subject.) (Mém. Acad. Sc. Instit. France, Vol. 36, pp. 229–243.) 4to. *Paris, 1870*
Examples of the reduction of metals in capillary spaces.

3629.— —Troisième mémoire: (The same subject). (Mém. Acad. Sc. Instit. France, Vol. 36, pp. 455–493.) 4to. *Paris, 1870*
Chemical effects due to electro-capillary action.

3630.— —Quatrième mémoire: (The same subject.) (Mém. Acad. Sc. Instit. France, Vol. 36, pp. 497–556.) 4to. *Paris, 1870*
Measurement of capillary spaces; apparatus illustrated.

3631.— —Cinquième mémoire: Sur les phénomènes électro-capillaires comprenant les reductions métalliques dans les espaces capillaires l'endosmose, l'exosmose et la dialyse. (Mém. Acad. Sc. Instit. France, Vol. 36, pp. 537–661.) 1 plate. 4to. *Paris, 1870*
Historical review of osmosis.

3632.— —Sixième mémoire: Sur les phénomènes électro-capillaires, la formation des oxydes, des cilicates, aluminates cristallisés et hydratés, et les effets de diffusion entre des liquides qui ne se mélangent pas. (Mém. Acad. Sc. Instit. France, Vol. 36, pp. 663–681.) 4to. *Paris, 1870*
Some phenomena of dialysis.

3633.— —Septième mémoire: Sur les phénomènes électro-capillaires. (Mém. Acad. Sc. Instit. France, Vol. 36, pp. 756–824.) 4to.
Paris, 1870
Electro-capillary currents in organic bodies; also electromotive force of liquids involved in electro-capillary phenomena.

3634.— —Huitième mémoire: (The same subject). (Mém. Acad. Sc. Instit. France, Vol. 36, pp. 825–947.) ill. 4to. *Paris, 1870*
Memoir on muscular currents and the nutrition of tissues.
—See also 2564.

3635. **Bolton,** Frank. Letter to James Anderson. 7 pp. Folio.
London, 1870
Refers to Captain Bolton's method of using the lime light or the electric light for military purposes.
—See also 3596.

3636. **Bradley,** L(everett). Aurora borealis. (Proc. Amer. Ass. Adv. Sc., Vol. 19, pp. 82–98.) 8vo. *Salem, 1870*
Discusses the origin and manifestations of atmospheric electricity, including the aurora borealis: written for the general reader.
—See also 3383.

3637. **Caplin,** J. F. Prospectus and list of terms, of Dr. Caplin's electro-chemical bath and galvano-therapeutic institution. 31 pp. 12mo. *London, 1870*

3638. **Gore,** G(eorge). On the magnetism of electro-dynamic spirals. (Philos. Mag., Ser. IV, Vol. 40, pp. 264–268.) 8vo. *London, 1870*
Influence of temperature. (Proof copy.)
—See also 3022.

3639. **Hearder,** Jonathan N(ash). (1809–1876.) The degeneration of our sea fisheries. (Reprinted, Trans. Devonshire Ass. Adv. Sc.) 25 pp. 8vo. *Plymouth, 1870*
The author of this paper on sea-fisheries was an electrician of some distinction.
—See also 2916.

3640. **Joulin.** Rapport sur l'appareil autographique inventé par B. Meyer, d'Uffholtz. (Extract, Bull. Soc. Industr. Mulhouse, 1870.) 13 pp. 2 plates. 8vo. *Mulhouse, 1870*
A writing telegraph.

3641. **Lacoine,** E(mile). Essai de l'isolation et de la conductibilité d'une ligne. (Journ. Télégr.) 1 p. 8vo. (*Constanz, 1870?*)
Determination of insulation resistance of a telegraph line.
—See also 3583.

3642. **Leitch,** W. Directions for the adjustment and use of the quadrant electrometer. 1 p. 1 plate. 8vo. *Glasgow, 1870*
Practical instructions for setting up the quadrant electrometer.

3643. **Loomis,** Elias. (1811–1889.) Comparison of the mean daily range of the magnetic declination with the number of auroras observed each year and the extent of the black spots on the surface of the sun. (Amer. Journ. Sc. & Arts, Ser. II, Vol. 50, pp. 153–172; Ser. III, Vol. 5, pp. 245–260.) 1 plate. 8vo. *New Haven, 1870–1873*
List of aurorae from 1739-1870; a second list extended from 1776-1872.
—See also 2866.

3644. **Lucas,** (Felix) & (Achille Auguste) **Cazin.** (1832–1877.) Recherches expérimentales sur la durée de l'étincelle électrique. (Comptes rendus Acad. Sc., Vol. 70, pp. 923–926.) 4to. *Paris, 1870*

3644a.——(The same paper.) (Mém. Sav. Etrang. Acad. Sc., Vol. 22, No. 3.) 50 pp. 1 plate. 4to. *Paris, 1873*
Duration of the spark-discharge from a battery of Leyden jars.
—See also 3336.

3645. **Mayer,** Alfred M(arshall). Abstract of a research on a simple method of measuring electrical conductivities by means of two equal and opposed magneto-electric currents or waves. (Proc. Amer. Ass. Adv. Sc., Vol. 19, pp. 76–81) ill. 8vo. *Washington, 1870*
Description of apparatus: conductivity of silver, copper, iron.
—See also 3670, 3695, 3732.

3646. **Perry,** Stephen J(oseph). (1833–1889.) Magnetic survey of the West of France, 1868. (Philos. Trans. Roy. Soc., 1870, pp. 33–50.) 3 plates. 4to. *London, 1870*
Maps showing the isogonic, isoclinic and isodynamic lines for the epoch 1858-1868. Father Perry was assisted in his work by Father Sidgreaves, both of Stonyhurst College.
—See also 3697.

3647. **Sabine,** (Sir) E(dward). (1788–1883.) Contributions to terrestrial magnetism. No. 12. The magnetic survey of the British Islands reduced to the epoch 1842–1845. (Philos. Trans. Roy. Soc., 1870, pp. 265–275.) 3 plates. 4to. *London, 1870*
Historical sketch of the survey; maps of the British Isles showing each of the three magnetic elements.
—See also 2544.

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Paper read at the British Association, 1870.
—See also 3315.

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Tractive force exerted along the axis of a bar of soft iron by a current passing through a surrounding cylindrical helix.

3650. **Tait,** (Peter Guthrie). (1831–1900.) On Green's and other allied theorems. (Trans. Roy. Soc., Edinburgh, Vol. 26, pp. 69–84.) 4to. *Edinburgh, 1870*
Quaternion treatment of the subject.
—See also 1891, 3163, 3324.

3651. **V.....,** J. La télégraphie aux Etats-Unis d'Amérique; projets d'intervention gouvernementale, 1869. (Extract, Ann. Trav. Publics, Belgique, Vol. 28.) 70 pp. 8vo. *Brussels, 1870*
Remarks on the bill of 1868-1869 for the establishment in the United States of a Postal Telegraph System.
—See also 3614.

3652. **Kerkwijk,** J. J. van. Eene geschiedenis van de invoering der electromagnetische telegrafie in Nederland, in verband met haren tegenwoordigen toestand. (Nieuwe Verh. Bataaf. Genotsch. proef. Wysbeerte, Ser. II, D. 2. 1 Stuk, pp. 1–95+ lviii pp.) 4to. *Rotterdam, 1870*
The Dutch telegraph system: short history of electric telegraphy.
—See also 1630, 3764.

3653. **Waltenhofen,** A(dalbert Carl) von. Ueber einen einfachen Apparat zur Nachweisung des magnetischen Verhaltens eiserner Roehren. (Sitz. Ber. Akad. Wiss. Math. Nat. Kl., Vol. 62, pp. 438–440.) 1 plate. 8vo. *Vienna, 1870*
Apparatus for detecting the magnetic condition of iron pipes.
—See also 3475.

3654. **The aurora** borealis, September 24th, and October 24th and 25th, 1870. (Proc. Meteorolog. Soc., 1870, pp. 216–236.) 1 plate. 8vo. *London, 1870*

Description of an aurora by various observers in different countries.

3655. **Biographical** sketch of Rev. Dr. Peter Mark Roget. (Proc. Roy. Soc., Vol. 18, pp. xxviii–xl.) 8vo. *London, 1870*

Roget's *spiral;* his *thesaurus.*

3656. **Hammond Co.** Electrical Engineering College. Prospectus. 4 pp. 4to. *London, (1870)*

3657. **Practical** hints on the management of the compasses of iron and composite ships, with a new diagram and deviation curve. 35 pp. ill. & 1 diagr. 8vo. *South Shields, 1870*

General information on the compass with practical instruction for determining the deviation.

3658. **The telegraph** to India; suggestions to senders of messages. 16 pp. 1 map. 8vo. *London, 1870*

Practical information respecting the different routes to India.

3659. **Abbe,** Cleveland. Historical notes on the systems of weather telegraphy, and especially their development in the United States. (Amer. Journ. Sc., Ser. III, Vol. 2, pp. 81–88.) 8vo. *New Haven, 1871*

Weather reports and agricultural interests.

3660. **Codazza,** Giovanni. (1816–1877.) Posta pneumatica. (Extract, Ann. R. Museo Industriale Italiano.) 18 pp. 8vo. *Turin, 1871*

Mathematical paper on pneumatic transmission.
—See also 3495.

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Theoretical aspects of the problem; also plant of the Pneumatic Despatch Company, London.

3662. **Evans,** (Sir) F(rederic) J(ohn Owen). (1816–1886.) Curves of equal magnetic variation, 1871, reduced to that epoch from observations at sea 1871 and from various magnetic surveys undertaken by colonial and foreign governments. 1855–1870. Sq. folio. *London, 1871*

Map of great magnetic interest.
—See also 3543.

3663. **Gibson,** John C. & T. **Barclay.** Measurements of specific inductive capacity of dielectrics, in the physical laboratory of the University of Glasgow. (Philos. Trans. Roy. Soc., 1871, pp. 573–583.) 2 plates. 4to. *London, 1871*

Instruments and methods employed in a series of experiments on the specific inductive capacity of paraffin.

3664. **Gore,** G(eorge). On fluoride of silver. Part II. (Philos. Trans. Roy. Soc., Vol. 16, pp. 321–334.) Part III. (Proc. Roy. Soc., Vol. 20, pp. 70–72.) 4to. & 8vo. *London, 1871–1872*

The author shows that the action of iodine under the influence of heat is

to produce fluoride of iodine and a double salt composed of iodide of silver and fluoride of platinum.
—See also 3022.

3665. **Hearder,** Jonathan N(ash). (1809–1876.) Aurora borealis. 3 pp. 8vo. *1871*
Abstract of a lecture.
—See also 2916.

3666. **Highton,** H(enry). New forms of galvanic batteries. (Chem. News, Vol. 23, pp. 142–144.) 4to. *London, 1871*

3667.— —On the relations between chemical change, heat, and force, with a view to the economy of electro-dynamic engines. (Quart. Journ. Sc., Vol. 1, pp. 77–99.) 8vo. *London, 1871*
Criticism of accepted views on the energy due to certain electrochemical combinations.
—See also 5009.

3668. **Horne,** R(ichard) H(enry, also Hengist). (1803–1884.) The great peace maker; a submarine dialogue. 32 pp. 12mo. *London, 1871*
The dialogue is between the sea and the telegraph.

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Notes of a Friday evening discourse at the Royal Institution.
—See also 3034.

3670. **Mayer,** Alfred M(arshall). Observations on the variation of the magnetic declination in connection with the aurora of October 14, 1870. (Amer. Journ. Sc., Ser. III, Vol. 1, pp. 77–82.) 8vo. *New Haven, 1871*
Remarks on the connection between solar activity and terrestrial magnetism.

3671.— —On a method of fixing, photographing, and exhibiting the magnetic spectra. (Amer. Journ. Sc., Ser. III, Vol. 1, pp. 263–266.) 8vo. *New Haven, 1871*
Note on author's method of "fixing" magnetic lines. (See No. 3677.)
—See also 3645.

3672. **Sabine,** (Sir) Edward. (1788–1883.) Records of the magnetic phenomena at the Kew Observatory. No. 4. Analysis of the principal disturbances shown by the horizontal and vertical force magnetometers of the Kew Observatory, from 1859 to 1864. (Philos. Trans. Roy. Soc., 1871, pp. 307–319.) 4to. *London, 1871*
There are seven complete years for the observations of horizontal force and six for the vertical.
—See also 2544.

3673. **Sharples,** S(tephen) P(aschall). On some forms of the galvanic battery. (Amer. Journ. Sc., Ser. III, Vol. 1, pp. 247–251.) 8vo. *New Haven, 1871*
The Maynooth battery.

3674. **Stotherd,** R(ichard) H(ugh). (1828–1895.) Defensive submarine warfare. (Journ. Roy. United Service Instit., Vol. 15, pp. 1–31.) 1 plate. 8vo. *London, 1871*
Submarine mines, mechanical and electrical.

3675. **Varley,** Cromwell Fleetwood. (1828–1883.) Polarization of metallic surfaces in aqueous solutions; on a new method of obtaining electricity from mechanical force, and certain relations between electrostatic induction and the decomposition of water. (Philos. Trans. Roy. Soc., 1871, pp. 129–136.) 2 plates. 4to. *London, 1871*

Capacity of platinum plates immersed in a solution of sulphuric acid and water. Suggested explanation of ball lightning.

3675a.— —(The same paper.) Abstract. (Proc. Roy. Soc., Vol. 19, pp. 236–246.) 8vo. *London, 1871*

—See also 3372.

3676. **Waltenhofen,** A(dalbert Carl) von. Bericht ueber eine neue Thermosaeule von grosser Wirksamkeit. (Dingler's Polytechn. Journ., Vol. 200, pp. 10–19.) 1 plate. 8vo. *Augsburg, 1871*

Thermopile for commercial purposes.

—See also 3475.

3677. **Electricity.** (Quart. Journ. Sc., Vol. 1, pp. 427–432.) 8vo. *London, 1871*

Professor A. M. Mayer's method of fixing and photographing magnetic spectra (See No. 3671); Wheatstone's magneto-electric counter for registering number of revolutions of machinery.

3678. **Airy,** (Sir) George Biddell. (1801–1892.) Experiments on the directive power of large steel magnets, of bars of magnetized soft iron, and of galvanic coils, in their action on external small magnets. With appendix, containing an investigation of the attraction of a galvanic coil on a small magnetic mass. By James Stuart. (Philos. Trans. Roy. Soc., 1871, pp. 485–497.) 4to. *London, 1871*

Experimental study of the distribution of magnetic power in the different parts of a steel magnet.

—See also 2750.

3679. **Becquerel,** (Antoine César.) (1788–1878.) Mémoire sur l'emploi des forces électro-chimiques et électro-capillaires pour la formation des amalgames cristallisés ainsi que d'autres composés. (Mém. Acad. Sc., Vol. 38, pp. 499–631.) 1 plate. 4to. *Paris, 1872*

Electro-capillary cells with constant current.

—See also 2564.

3680. **Bennoch,** Francis. My experience of the electric bath. 12 pp. 24mo. *London, 1872*

Testimony favorable to electrotherapeutic treatment.

3681. **Brodie,** (Sir) B(enjamin) C(ollins). (1817–1880.) An experimental inquiry on the action of electricity on gases. I. On the action of electricity on oxygen. (Philos. Trans. Roy. Soc., 1872, pp. 435–484.) 2 plates. 4to. *London, 1872*

Production of ozone and its chemical properties.

3682. **Carter,** S(amuel). (?— 1898.) (Three letters from S(amuel) Carter to Latimer Clark about portrait of Sir Francis Ronalds.) *1872–1873*

3683. **Challis,** (James). (1803–1882.) On the hydrodynamical theory of attractive and repulsive forces. (Philos. Mag., Ser. IV, Vol. 44, pp. 189–210.) 8vo. *London, 1872*
Principles and rules of the application of mathematics in hydrodynamics.
—See also 3123.

3684. **Clark,** (Josiah) Latimer. (1822–1898.) Letter to Samuel Carter on the Ronalds' library. *1872*

3685.— —Letter to the Editor of the *Times* on lightning conductors. *1872*

3686.— —On a voltaic standard of electromotive force. (Proc. Roy. Soc., Vol. 20, pp. 444–448.) 8vo. *London, 1872*
Abstract on the Clark's standard cell.

3686a.— —On a standard voltaic battery. (Philos. Trans. Roy. Soc., 1874, pp. 1–14.) ill. 4to. *London, 1874*
Reference to the B. A. paper of the author, 1861, recommending the adoption of standard units of electrical measurements; full description of the Clark standard cell. (See No. 1510.)
—See also 2897.

3687. **Edelmann,** M(ax) Th(omas). Magnetometer fuer Schulzwecke. (Carl's Repertorium, Vol. 8.) 18 pp. 4 plates. 8vo. *Munich, 1872*
Description of the author's galvanometer for class and lecture purposes.
—See also 1829.

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The paper contains the magnetic declination for a considerable number of places on the coasts of England, Scotland and Ireland, together with the annual change in that element.
—See also 3543.

3689. **Gordon,** J(ames) E(dward) H(enry). (1852–1893.) Description of a new anemometer for indicating and registering the force and direction of the wind at any distance from the vane, etc. (Philos. Mag., Ser. IV, Vol. 43, pp. 32–38.) 1 plate. 8vo. *London, 1872*
—See also 2145, 4010, 4225, 5415.

3690. **Gore,** George. List of original scientific investigations, and papers on scientific subjects. 4 pp. 8vo. *Birmingham, 1872*
The list contains the titles and dates of publication of 75 papers by the author.

3690a.— —List of (his) published books, papers, researches, etc. 4 pp. 8vo. *London, 1873*

3691.——On the present position of science in relation to the British Government. 8 pp. 8vo. *Birmingham, 1872*

3692.——On the solvent power of liquid cyanogen. (Proc. Roy. Soc., Vol. 20, pp. 67–70.) 8vo. *London, 1872*

It is concluded that liquid cyanogen is remarkably inert and possesses but little solvent power.

—See also 3022.

3693. **Hudson,** Henry. On wave- theories of light, heat and electricity. (Philos. Mag., Ser. IV, Vol. 44, pp. 210–219.) 8vo. *London, 1872*

Huyghens's assumption of a second vibrating medium consisting of the ether and molecules of matters conjointly, deemed erroneous.

3694. **Kohlrausch,** F(riedrich Wilhelm Georg). Ueber die elektromotorische Kraft sehr duenner Gasschichten auf Metallplatten. (Nachr. K. Ges. Wiss., Goettingen, 1872, pp. 453–465.) 8vo. *Gottingen, 1872*

The *e. m. f.* of polarization.

—See also 3548.

3695. **Mayer,** Alfred Marshall. The earth a great magnet. (University series, No. 9, pp. 213–284.) 1 plate. 12mo. *New Haven, 1872*

Lecture on general magnetic phenomena; numerous references to original works.

—See also 3645.

3696. **Munro,** J(ohn). Electrical signalling and the siphon recorder. (Popular Sc. Review, Vol. 11, pp. 358–367.) ill. 8vo. *London, 1872*

The paper deals briefly with relevant historical matters.

—See also 2331, 3884, 3957, 4024, 4092, 5445.

3697. **Perry,** Stephen J(oseph). (1833–1889.) Magnetic survey of the East of France in 1869. (Philos. Trans. Roy. Soc., 1872, pp. 7–27.) 4to. *London, 1872*

Table of the three magnetic elements for the 21 stations at which observations were made.

—See also 3646.

3698. **Petersen,** (Heinrich Jacob Reinhold) & (Georg Adolph) **Ermann.** (1806–1877.) Report on the Gaussian constants for 1829, or a theory of terrestrial magnetism founded on all available observations. (Report, British Ass. Adv. Sc., Vol. 42, pp. 1–23.) 8vo. *London, 1872*

The Gaussian constants refer to the magnetic potential of any point on the earth's surface.

—See also 2628.

3699. **Phillips,** S(amuel) E. What is the atomic weight of indium? (Chemical News, Vol. 26, pp. 2–4.) 8vo. *London, 1872*

The atomic weight of indium is given as 37.8.

3700. **Radcliffe,** C(harles) B(land). (1822–1889.) Electrophysiologica. (Reprinted, Nature.) 40 pp. 1 plate. 12mo. *London, 1872*

Electric resistance of tendon, muscle, brain; electric history of muscle.

—See also 3201.

3701. **Russell,** H. C. On a self-registering tide-gauge and electrical barograph. (Quart. Journ. Meteorolog. Soc., Vol. 1, p. 122.) 8vo. *London, 1872*

3702. **Sabine,** (Sir) Edward. (1788–1883.) Contributions to terrestrial magnetism. No. 13. (Philos. Trans. Roy. Soc., 1872, pp. 353–433.) 3 plates. 4to. *London, 1872*

The magnetic elements for a great many places in high latitudes, being a contribution to terrestrial magnetism in furtherance of the work of Halley and Hansteen. (Autograph copy dedicated to Robert Willis.)
—See also 2544.

3703. **Siemens,** (Sir) Charles W(illiam). (1822–1883.) On measuring temperatures by electricity. (Proc. Roy. Instit., Vol. 6, pp. 438–448.) ill. 8vo. *London, 1872*

The author's electrical pyrometer.

3704.——Pneumatic dispatch tubes: the circuit system. (Excerpt, Proc. Civil Engin., Vol. 33.) 58 pp. 2 plates. 8vo. *London, 1872*

Description of general systems of pneumatic transmission.
—See also 3107.

3705. **Tarry,** H. Des courants magnétiques et des explosions solaires qui ont accompagné l'aurore boréale du 7 juillet. 4 pp. 4to. *Paris, 1872*

Short communication on the aurora borealis, sun spots and magnetic disturbances.

3706.——L'aurore polaire et orage magnétique du 14 et 15 Octobre. 4 pp. 4to. *Paris, 1872*

Note on the aurora borealis of Oct. 14, 1872.

3707. **Warren,** Thomas T. P. Bruce. On the application of the calculating machine of Thomas de Colmar to electrical computations. (Excerpts Minutes Proc. Soc. Telegr. Engin., Vol. 1.) 30 pp. 8vo. *London, 1872*

Machine useful for reductions of capacity, dielectric resistance, specific conductivity.
—See also 3591.

3708. **Webb,** F(rederick) C(harles). (1828–1899.) On an electrical experiment with an insulated room. (Philos. Mag., Ser. IV, Vol. 44, pp. 170–174.) 8vo. *London, 1872*

A point in the theory of the frictional machine.
—See also 3111.

3709. **Whitehouse,** E(dward) O(range) Wildman. On a new hygrometer. (Quart. Journ. Meteorol. Soc., N. S. Vol. 1, pp. 63–69.) 4 plates. 8vo. *London, 1872*

Bulb wetted by contracted sulphuric acid as originally proposed by De la Rive in 1825.
—See also 4400, 4539, 4550, 5056, 5594, 5849.

3710. **Wilde,** Henry. On the influence of gas- and water-pipes in determining the direction of a discharge of lightning. (Philos. Mag., Ser. IV, Vol. 43, pp. 115–118.) 8vo. *London, 1872*
Instances showing that gas pipes and water pipes should be connected to the lightning conductor outside the building. (Autograph copy.)
—See also 3524.

3711. **Winter,** G. K. On the relation which the internal resistance of the battery and the conductivity of the wire bear to the maximum magnetizing force of an electromagnet coil. (Philos. Mag., Ser. IV, Vol. 33, pp. 414–417.) 8vo. *London, 1872*
Note on some relations regarding electromagnetic spirals.
—See also 1850, 3807, 3898, 4054.

3712. **Contributions** to terrestrial magnetism. By General Sir Edward Sabine.—Terrestrial and cosmical magnetism. By Edward Walker. (Edinburgh Rev., Vol. 136, pp. 407–428.) 8vo. *Edinburgh, 1872*
A review of the two publications.
—See also 945, 1657.

3713. **Airy,** (Sir) George Biddell. (1801–1892.) Magnetical observations on the Britannia and Conway tubular iron bridges. (Philos. Trans. Roy. Soc., 1872, pp. 331–339.) 1 plate. 4to. *London, 1873*
Magnetism acquired by the iron structure of the bridges due to the inductive action of the earth; hammering during the process of construction and vibration caused by passing train favored the acquisition of magnetism.
—See also 2750.

3714. **Barrett,** W(illiam) F(letcher). A fragment of Faraday's electrical discoveries. (Science lectures for the People, Ser. IV, No. 9.) 18 pp. 12mo. *London, 1873*
List of Faraday's discoveries arranged chronologically.
—See also 3489.

3715. **Becquerel,** Antoine César. (1788–1878.) Neuvième mémoire: Des moyens d'augmenter les effets des actions électro-capillaires dans les corps organisés. (Comptes rendus Acad. Sc., Vol. 38, pp. 313–326.) 4to. *Paris, 1873*
The circulation of the blood in connection with electro-capillary phenomena.

3716.— —Mémoire sur la décoloration des fleurs et des divers tissus végétaux par les décharges électriques et la chaleur. (Mém. Acad. Sc., Vol. 38, pp. 185–230.) 4to. *Paris, 1873*
The transportation of material particles by the electric spark.
—See also 2564.

3717. **Bertelli,** Timoteo. (1826–1905.) Sull' aurora boreale del 4 Febr., 1872. (Atti. Acad. Nuovi Lincei, Vol. 26, pp. 456–484.) 3 plates. 4to. *Rome, 1873*
Horary description of the aurora borealis of Febr. 4, 1872, as seen at Florence.
—See also 1441.

3718. **Cazin,** A(chille Auguste). (1832–1877.) Determination expérimentale de la quantité de magnétisme d'un aimant ou d'un

électro-aimant rectiligné. (Ann. Chim. et Phys., Ser. IV, Vol. 28, pp. 145–200.) 8vo. *Paris, 1873*

Determination of the strength of a magnet; causes of magnetism.
—See also 3336.

3719. **Clark,** (Josiah) Latimer. (1822–1898). On a common source of error in the measurement of currents of short duration when using galvanometers with shunts. (Journ. Soc. Telegr. Engin., Vol. 2, pp. 16–29.) 8vo. *London, 1873*

Mr. Clark was one of the earliest electricians to call attention to the care with which measurements must be made when shunts are used; the paper is followed by a short notice of the author's *potentiometer.*

3720.——On the storms experienced by the submarine cable expedition in the Persian Gulf on November 1st and 2nd, 1869. (Quart. Journ. Meteorolog. Soc., 1873, pp. 117–119.) 8vo. *London, 1873*

Some curious phenomena observed during an electric storm.
—See also 2897.

3721. **Domalip,** Karl. Zur mechanischen Theorie der Elektrolyse. (Sitz. Ber. Akad. Wiss. Math. Nat. Kl., Vol. 67, pp. 109–120.) 8vo. *Vienna, 1873*

Note on the mechanical theory of electrolysis.
—See also 1862.

3722. **Francisque-Michel,** R. Sur l'étalon voltaique de force électromotrice de Latimer Clark. (Les Mondes, Vol. 31, pp. 465–468.) 8vo. *Paris, 1873*

Note on Clark's standard cell.

3723. **Gore,** George. On the preparation of inorganic carbon. (Reprinted, Chem. News, Vol. 6, p. 160.) 16mo. (*London, 1873?*)

3724.——On some properties of anhydrous liquefied ammonia. (Proc. Roy. Soc., Vol. 21, pp. 140–147.) 8vo. *London, 1873*

A study of the general solvent properties of liquid anhydrous ammonia.
—See also 3022.

3725. **Jekyll.** On telegraph poles. (Journ. Soc. Telegr. Engin., Vol. 2, pp. 10–18.) 8vo. *London, 1873*

Means of supporting and strengthening telegraph poles subject to lateral strains.

3726. **Lee,** Robert Bristow. On the Riband telegraph post. (Journ. Soc. Telegr. Engin., Vol. 2, pp. 22–26.) 8vo. *London, 1873*

Manufacture and advantages of the iron pole known as the "Riband Telegraph Pole."
—See also 4397, 5840.

3727. **Lockeyer,** J. Norman and William Chandler **Roberts-Austen.** (1843–1902.) On the quantitative analysis of certain alloys by means of the spectroscope. (Proc. Roy. Soc., Vol. 21, pp. 507–514.) 8vo. *London, 1873*

Experiments on alloys of zinc and cadmium.

3728. **Lovering,** Joseph. On the determination of transatlantic longitudes by means of the telegraphic cables. (Mem. Amer. Acad. Sc., Vol. 9, pp. 437–477.) 4to. *Boston, 1873*

Description of methods and statement of results.
—See also 3138.

3729. **M'Kichan,** Dugald. Determination of the number of electrostatic units in the electro-magnetic units made in the physical laboratory of Glasgow University. (Philos. Trans. Roy. Soc., 1873, pp. 409–427.) 4to. *London, 1873*

The *e. m. f.* of a battery of Daniell cells was measured directly in absolute electrostatic units by means of a Thomson's new absolute electrometer; its e. m. f. was also obtained in electromagnetic measure from the current produced in a circuit of known resistance; resulting value for v 29×10^9 centimetres per second.

3730. **Mallock,** H. On the block system of working on railways. (Journ. Soc. Telegr. Engin., Vol. 2, pp. 10–23.) 8vo. *London, 1873*

The absolute and permissive block.
—See also 4443, 4639.

3731. **Maxwell,** J(ames) Clerk. (1831–1879.) On action at a distance. (Proc. Roy. Soc., Vol. 7, pp. 44–54.) 8vo. *London, 1873*

On Faraday's lines of force.
—See also 3034.

3732. **Mayer,** Alfred M(arshall). On the effects of magnetization in changing the dimensions of iron, steel and bismuth bars. (Amer. Journ. Sc., Ser. III, Vol. 5, pp. 170–179.) 8vo. *New Haven, 1873*

Discussion of Joule's experiments.
—See also 3645.

3733. **Mignon et Rouart.** Sur les appareils pour la transmission pneumatique des dépêches. (Bull. Soc. d'Encourag. Industr., Ser. III, No. 28, pp. 1–18.) 2 plates, 1 plan. 4to. *Paris, 1873*

Pneumatic transmission: the author's system.

3734. **O'Reilly,** M(ichael) F(rancis) (Brother Potamian). The Gramme machine; or, The new electric light on the clock tower, Westminster. (Popular Sc. Rev., 1873, pp. 25–40.) 8vo. *London, 1873*

Article on the principles, construction and uses of the Gramme machine.

3735. **Pacinotti,** Antonio. Sulla elettro-calamita trasversale ruotante adoperata come elettromotore. (Nuovo Cimento, Ser. II, Vol. 9, pp. 206–209; Vol. 10, pp. 5–9.) 1 plate. 8vo. *Pisa, 1873*

The author's armature-core and dynamo; also note of Gaugain on the Gramme machine.
—See also 1601.

3736. **Pérard,** Louis. Étude sur les procédés suivis pour déterminer les élements du magnétisme terrestre (déclinaison, inclinai-

son, et intensité). (Mém. Courronn. et Mém. Sav. Etrang. Acad. Sc., Bruxelles, Vol. 37, vi+194 pp.) 2 plates. 4to.
Brussels, 1873

Discussion of methods in use for determining the magnetic elements in absolute measure.

3737. **Preece,** (Sir) W(illiam) H(enry). On the block system of working on railways. (Excerpt Minutes Telegr. Engin., April, 1873.) 9 pp. 8vo. *London, 1873*

Proposed "block" system.

—See also 3556.

3738. **Rowell,** G(eorge) A(ugustus). (1804–1892.) Letter to the Secretary of the Smithsonian Institution, Washington, on electricity as the expansive force of steam and soliciting an experimental investigation of the theory and also of an allied theory submitted for consideration at the meetings of the British Association 1840 and 1848, and in various publications. 7 pp. 8vo. *Oxford, 1873*

Letter addressed to Professor Joseph Henry.

—See also 1465, 3839.

3739. **Sanderson,** J(ohn Scott) Burden. Note on the electrical phenomena which accompany irritation of the leaf of Dionaea Muscipula. (Proc. Roy. Soc., Vol. 21, pp. 495–507.) 8vo.
London, 1873

The current in the leaf and in the stalk.

3740. **Scott,** Robert H(enry). On some results of weather telegraphy. (Quart. Journ. Meteorol. Soc., Vol. 1, pp. 181–188.) 8vo.
London, 1873

—See also 2004.

3741. **Siemens,** (Sir) C(harles) W(illiam). (1822–1883.) On iron telegraph poles. (Journ. Soc. Telegr. Engin., Vol. 2, pp. 19–21.) 8vo. *London, 1873*

—See also 3107.

3742. **Stow,** Fenwick W. Description of an electrical self-registering anemometer and rain gauge. (Quart. Journ. Meteorol. Soc., Vol. 1, pp. 157–160.) 8vo. *London, 1873*

Construction of the Morse instrument.

3743. **Thomson,** (Sir) William (Lord Kelvin). (1824–1907.) On submarine signalling, friction dynamometers, and deep sea sounding. (Engineer, Vol. 35, p. 174.) Folio. *London, 1873*

3744.— —On the rope-dynamometer, with application to deep-sea sounding by steel wire. (Trans. Instit. Engin. & Shipbuilders, Sess. 16, pp. 3–12.) 1 plate. 8vo. *London, 1873*

—See also 2946.

3745. **Walenn,** W(illiam) H(enry). Electro-depositing copper upon iron. (Journ. Soc. Arts, Vol. 21, pp. 228–229.) 4to.
London, 1873

Brief history, theory and practice of the process.

3746.——On the electric light. (Journ. Soc. Arts, Vol. 21, pp. 381–382+398–399.) 4to. *London, 1873*
General considerations on the production and properties of the electric light.

3747. **Warren,** Thomas T. P. Bruce. On a method of testing submarine telegraph cables during paying out. (Philos. Mag., Ser. IV, Vol. 45, pp. 199–203.) 8vo. *London, 1873*
Continuity signals between ship and shore station.
—See also 3591.

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Special advantages of iron telegraph-poles for India and Australia.
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—See also 1931, 4469.

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Essential condition of a torpedo system of defense.

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—See also 3137.

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Results of experimental observations, 1873.
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Note on electrostatic induction showing the distribution both of the bound and the free charge.

—See also 3155.

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Recent method of making the test.

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3769.——(Specimen record-forms for data in laying submarine telegraph cables.) 10 pp. Folio. (*London, 1874*)

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3772. **Batisse.** Notice sur les travaux de percement du Saint Gothard. 31 pp. 1 plate. 8vo. *Paris, 1875*

The St. Gothard tunnel.

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—See also 1969.

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Heat developed by reversals of magnetism.

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3775bis. **Crespin,** A. La poste atmosphérique; transport des correspondence entre Paris et Versailles. 32 pp. 6 plates. 8vo. *Paris, (1875)*

Pneumatic postal service between Paris and Versailles with sectional drawings, etc.

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Results obtained with a silver-chloride battery of 1,080 cells.
—See also 3797, 4176.

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Experiments with 2,400 cells tending to show that the length of spark discharge varies as the square of the number of cells in the battery.

3776b.——Experimental researches on the electric discharge with the chloride of silver battery. (Philos. Trans. Roy. Soc., Vol. 169, pp. 55–121+155–241.) 7 plates. 4to. *London, 1878*

Part I. of this remarkable research deals chiefly with the striking distance in air and different gases under varying conditions of terminals; battery of 1,800 and 11,000 chloride of silver cells used; reference to O'Shaughnessy's cell. Part II. is an experimental study of the electrical discharge on "exhausted" tubes. One of the conclusions in Part III. is that "the electric arc and the stratified discharge in vacuum tubes are modifications of the same phenomenon." In these researches, a battery of 10,000 chloride of silver cells was used.

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Action of light on the retina of a number of animals.
—See also 4000.

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Appreciation of Wheatstone's scientific work by the Secretary of the Académie des Sciences.
—See also 3287.

3779. **Endlich,** Frederick M(iller). Electric phenomena in the Rocky mountains. (The Transatlantic, Vol. 4, pp. 36–38.) L. 8vo. *London, 1875*

Presence of electricity at high altitudes; effects on traveler; lightning tubes.

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Special reference to Ohm's law and Joule's law for the development of heat in a circuit.
—See also 3502.

3781. **Foster,** G(eorge) Carey & (Sir) Oliver J(oseph) **Lodge.** On the flow of electricity in a uniform plane conducting surface.

(Philos. Mag., Ser. IV, Vol. 49, pp. 385–400+453–472; Vol. 50, pp. 475–489.) 2 plates. 8vo. *London, 1875*

Study of equipotential lines.

—See also 3502, 3827.

3782. **Foster,** M., & A. G. **Dew-Smith.** On the behavior of the hearts of mollusks under the influence of electric currents. (Proc. Roy. Soc., Vol. 23, pp. 318–343.) 8vo. *London, 1875*

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3783. **Garibaldi,** Pietro Maria. Osservazioni magnetiche fatte in occasione dell'ecclissi anulare di sole, 28–29 Settembre 1875 visibile in parte. 10 pp. 1 plate. L. 8vo. *Genoa, 1875*

Change in magnetic declination during the eclipse of the sun, September, 1875, observed in Genoa.

3784. **Gladstone,** J(ohn) H(all). (1827–1902.) The copper-zinc couple and its effects. (Proc. Roy. Instit., Vol. 7, pp. 521–523.) 8vo. *London, 1875*

3785.——The progress of science in elementary schools. (Proc. Roy. Instit., Vol. 7, pp. 449–454.) 8vo. *London, 1875*

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—See also 3823, 3941.

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Best arrangement of a number of Daniell cells for given telegraphic conditions.

—See also 3583.

3788. **Macfarlane,** Donald. Note on Dulong and Petit's law of cooling. (Proc. Roy. Soc., Vol. 23, pp. 465–468.) 8vo. *London, 1875*

A mathematical note.

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—See also 1396, 3830.

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The object of the investigation was to determine the most suitable glass for use in electrometers.
—See also 2043, 3860, 3886, 3910, 3959, 4026, 4073, 4095, 4111, 4141, 4162, 4166, 4212, 4256, 4311, 4322, 4340, 4348, 5415, 5755.

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Underground system of the London and Manchester Magnetic Company.
—See also 4636, 5025.

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Mathematical treatment of the problem.
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3795. Sabine, (Sir) Edward. (1788–1883.) Contributions to terrestrial magnetism. No. 14. (Philos. Trans. Roy. Soc., 1875, pp. 161–203.) 3 plates. 4to. *London, 1875*
Second half of the magnetic survey of the Northern Hemisphere observations and maps showing the lines of equal declination, dip, and intensity.
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Description of the author's instruments for temperature determinations with diagrams, tables, etc. (Autograph copy, dedicated to Sir J. P. Kay Shuttleworth.)
—See also 3107.

3797. Spottiswoode, William. (1825–1883.) On the combination of colour by polarized light. (Proc. Roy. Instit., Vol. 7, pp. 291–296.) 8vo. *London, 1875*
—See also 3776, 4039, 5724.

3798. Sugg, William (Thomas). Apparatus for the estimation of the illuminating power of gas. (Letheby's system.) 4 pp. 8vo. *London, (1875?)*
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3799. Ternant, A. L. Construction des cables sous-marins. (Bull. Soc. Industr., Marseille, (1875?) 24 pp. ill. 8vo. *Marseille, (1875)*
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—See also 1756, 4152.

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—See also 2946.

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General account of scientific work of Cavendish, physicist and chemist.

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Notes on caoutchouc and gutta-percha.

3807. **Winter,** G. K. On block telegraph instruments. 10 pp. 2 plates. (*Madras, 1875?*)
The block system as used on the Madras railway.
—See also 3711.

3808. **Electro-plates.** July 1875—March 1876. *London, 1875–1876*
Several of these humorous sketches refer to such men as Galvani, Franklin, Preece and C. F. Varley.

3809. **The influence** of steam and electricity. (International Rev., Vol. 2, pp. 623–635.) L. 8vo. *New York, 1875*
Political aspect and economic features of the subject.

3810. **School** of Submarine Telegraph. Circulars. 1 p. 8vo.+2 pp. Folio. *London, (1875?)*

3811. **Toronto**–Magnetic Observatory. Abstract and results of magnetical and meteorological observations. (1841–1871.) 254 pp. 8vo. *Toronto, 1875*
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—See also 3856, 4109, 4162.

3813. **Agudio, T.** Aux interéssés du chemin de fer du Saint-Gothard; mémoire et propositions pour l'application du systême Agudio aux rampes d'accès et à la traversée du grand tunnel des Alpes. 45 pp. 3 plates. L. 8vo. *Turin, 1876*
The railway system proposed by the author is fully described and illustrated.

3814. **Beard,** George M(iller). (1839–1883.) Experiments with the alleged new force. (Reprinted, Arch. Electr. and Neurology, 1875.) 28 pp. 8vo. *New York, 1876*

Properties of "etheric" force.
—See also 2064.

3815. **Becquerel,** (Antoine César). (1788–1878.) Premier, second & troisième mémoires: Sur le mode d'intervention de l'eau et les forces électro-motrices dans les actions chimiques produites pendant le mélange des dissolutions salines neutres, acides ou alcalines. (Mém. Acad. Sc., Vol. 40, pp. 1–78.) 4to. *Paris, 1876*

Researches on the electromotive force due to the mixture of saline acid and alcaline solutions.

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Discussion of the formation of certain crystalline substances.
—See also 2564.

3817. **Broun,** J(ohn) A(llan). (1817–1879.) On the variations of the daily mean horizontal force of the earth's magnetism. (Philos. Trans. Roy. Soc., 1876, pp. 387–403.) 1 plate. 4to. *London, 1876*

Action of the sun and moon in producing the diurnal changes.
—See also 2846.

3818. **Chambers,** Charles. (1834–1896.) The absolute direction and intensity of the earth's magnetic force at Bombay, and its secular and annual variations. (Philos. Trans. Roy. Soc., 1876, pp. 75–90.) 4to. *London, 1876*

Observations of declination, dip and horizontal force made during the years 1867-1874.
—See also 3339.

3819. **Clark,** (Josiah) Latimer. (1822–1898.) On Clamond's thermo-electric battery. (Excerpt, Journ. Telegr. Engin., 1875.) 23 pp. ill. 8vo. *London, 1876*

Thermo-electric history and principles: construction and application of Clamond's generator (1874).

3820.——On the Nicolaieff floating and depositing dock. 11 pp. 1 plate. 4to. *1876*

Paper read before the Institution of Naval Architects.
—See also 2897.

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—See also 3389.

3822. **Gore,** G(eorge). On some electro-magnetic rotations of bar-magnets and conducting-wires on their axes. (Proc. Roy. Soc., Vol. 24, pp. 121–128.) ill. 8vo. *London, 1876*
Experiment showing the rotation of a magnetized rod having similar poles at its extremities when a current is passed through it from end to end.
—See also 3022.

3823. **Herwig,** Hermann (Anton Bernhard). (1844–1881.) Ueber den Durchgang starker Inductionsstroeme durch Fluessigkeiten. (Ann. Phys. und Chem., Vol. 159, pp. 61–93.) 8vo.
Leipzig, 1876
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3825.——Ueber die Temperatur der Elektroden im Inductionsfunken. (Ann. Phys. und Chem., Vol. 159, pp. 566–572.) 8vo.
Leipzig, 1876
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—See also 3786.

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Description of the two forms of repeaters in use together with general considerations authorizing the need for such repeating apparatus.
—See also 3759.

3827. **Lodge,** (Sir) Oliver J(oseph). On some problems connected with the flow of electricity in a plane. (Philos. Mag., Ser. V, Vol. 2, pp. 37–47.) 8vo. *London, 1876*
Conditions of flow in a bounded sheet containing point poles.

3828.——On a model illustrating mechanically the passage of electricity through metals, electrolysis and dielectrics, according to Maxwell's theory. (Philos. Mag., Ser. V, Vol. 2, pp. 353–374.) 8vo. *London, 1876*
The model, now well known, consists mainly of a flexible, inextensible, endless cord passing continuously over pulleys.

3829.——On a mechanical illustration of thermo-electric phenomena. (Philos. Mag., Ser. V, Vol. 2, pp. 524–543.) 8vo. *London, 1876*
Radiating power of certain metals and their specific electric resistance.
—See also 2365, 3781, 4090, 4162, 4357, 5415.

3830. **Mann,** Robert James. (1817–1886.) On the rhé-electrometre of Marianini; a new instrument for observing and recording the passage of electric discharges between the atmosphere and the earth. (Quart. Journ. Meteorol. Soc., N. S. Vol. 3, pp. 111–116.) 8vo. *London, 1876*
Instrument for use on telegraph lines to detect electrical disturbances in the atmosphere.
—See also 3789.

3831. **Morrison,** Gabriel James. The ventilation and working of railway tunnels. (Excerpt, Minutes Proc. Instit. Civil Engin., Vol. 44, Session 1875–1876.) 7 pp. ill. 8vo. *London, 1876*

Special reference to the London Metropolitan Railway and the Mont Cenis Tunnel.

3832. **Naccari,** (Andrea) & M(anfredo) **Bellati.** Delle proprietà termoelettriche del potassio a varie temperature. (Atti Reale Instit. Veneto Sc., Ser. IV, Vol. 2, pp. 875–887.) 8vo. *Venice, 1876*

Some experiments on the thermoelectric properties of potassium and sodium: data and formulae.

3833.——Delle proprietà termoelettriche del sodio a varie temperature. (Atti Reale Instit. Veneto Sc., Ser. IV, Vol. 2, pp. 599–619.) 8vo. *Venice, 1876*

Thermo-electric power of certain metals.

3834. **Nipher,** Francis E(ugene). On a new form of lantern galvanometer. (Amer. Journ. Sc. and Arts, Ser. III, Vol. 11, pp. 111–114.) ill. 8vo. *New Haven, 1876*

Advantages of Barker's lantern galvanometer.
—See also 2414, 4094, 4276, 4308, 4329.

3835. **Outerbridge,** Alex. E. Electrical spectra of metals. Results of an examination as to the practicability of assaying metals used in coinage, by means of spectrum analysis made in and for the assay department of the U. S. of Philadelphia. (Proc. Amer. Phil. Soc., Vol. 14, pp. 162–173.) 3 plates. 8vo. *Philadelphia, 1876*

The conclusion reached is that assaying by means of spectrum analysis is impracticable for the purpose of mint operations.

3836. **Pissarewsky,** (Nicolai). (On telegraph cables.) (In Russian language.) 169 pp. ill. 2 plates. 8vo. *St. Petersburg, 1876?*

The pamphlet deals with the manufacture and laying of a submarine cable. (Autograph copy.)
—See also 4097.

3837. **Preece,** (Sir) W(illiam Henry). Railway travelling and electricity. (Popular Sc. Rev., Vol. 15, pp. 138–148.) 1 plate. 8vo. *London, 1876*

Statistics of railway accidents.

3838.——The applications of electricity to the protection of life on railways. (Proc. Roy. Instit., Vol. 8, pp. 35–42.) 8vo. *London, 1876*

—See also 3556.

3839. **Rowell,** G(eorge) A(ugustus). (1804–1892.) On the storm in the Isle of Wight, September 28, 1876, and on the cause of storms. 44 pp. 8vo. *Oxford, 1876*

—See also 3738.

3840. **Sabine,** Robert. (1837–1884.) British manufacturing industries. Edited by G. Phillips Bevan. No. II. Telegraphy. pp. 65–121. ill. 12mo. *London, 1876*

Telegraphy as a manufacturing industry.

3841.——On a method of measuring very small intervals of time. (Philos. Mag., Ser. V, Vol. 1, pp. 337–346.) 8vo. *London, 1876*

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3842.——On a method of measuring the contour of electric waves passing through telegraph lines. (Philos. Mag., Ser. V, Vol. 2, pp. 321–331.) 8vo. *London, 1876*

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3843.——On electricity disengaged between mercury surfaces and on the motions produced in mercury by deoxidation. (Philos. Mag., Ser. V, Vol. 2, pp. 481–499.) 8vo. *London, 1876*

Capillary attraction not an electric phenomena; theory of the Lippmann capillary electrometer.

—See also 3315.

3844. **Siemens,** (Sir) C(harles) W(illiam). (1822–1883.) On determining the depth of the sea without the use of the sounding line. (Philos. Trans. Roy. Soc., 1876, pp. 671–692.) 3 plates. 4to. *London, 1876*

Principle and use of the author's *bathometer;* the paper touches many practical points in the theory of gravitation.

—See also 3107.

3845. **Siemens,** (Ernst) Werner. (1816–1892.) Contributions to the theory of submerging and testing submarine telegraphs. (Journ. Soc. Telegr. Engin., Vol. 5, pp. 42–66.) 8vo. *London, 1876*

Mathematical and practical paper.

—See also 3259.

3846. **Spamer,** C. Ein leicht transportabler und billiger Inductions-Apparat. (Berlin. Klinische Wochenschr., 1876, No. 13.) 7 pp. 8vo. *Berlin, 1876*

Note on an induction apparatus.

—See also 3895.

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Two methods depending on simultaneous tests at both ends of the line.

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3863.——On certain modifications that must be introduced in the fundamental notions of the mathematical theory of electricity. 7 pp. 1 plate. 8vo. *Tokyo, 1877*

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A claim for priority.

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3870. **Carpenter,** W(illiam) B(enjamin). (1813–1885.) The radiometer and its lessons. (Nineteenth Century, Vol. 1, pp. 242–256.) L. 8vo. *London, 1877*

3871. **Clark,** (Josiah) Latimer. (1822–1898.) On a practical method of raising sunken vessels. 13 pp. 1 plate. 4to. *1877*

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3876. **Highton,** Elizabeth. Petition for a pension. 2 l. Folio. *London, (187–)*

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Successive charges of different sign given to a jar; effect of tapping; three ways in which the polarity of a dielectric may be affected.

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—See also 3465.

3884. **Munro,** J(ohn). Recent advances in telegraphy. (Quart. Journ. Sc., N. S. Vol. 7, pp. 354–381.) 8vo. *London, 1877*

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Shunts in theory and practice.

3888.— —The telephone and its application to military and naval purposes. (Extract, Journ. Military Sc.) 8 pp. 8vo. (*London,*) *1877*

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Principles on which telegraphic communication depends; Bain's chemical telegraph; Elisha Gray's telephone.

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General regulations concerning the military telegraph.

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—See also 3985, 4730, 4782.

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—See No. 2006 bis.

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—See also 2239.

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—See also 3034.

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Popular description of the Bell telephone.
—See also 3696.

3959. **Perry,** John & W(illiam) E(dward) **Ayrton.** On structures in an earthquake country. 8 pp. L. 8vo. *Tokyo, 1878*

Time of vibration of buildings, chimneys, mountains, (Autograph copy.)

3960.— —On the electrical properties of bees' wax and lead chloride. (Report British Ass. Adv. Sc., 1878, pp. 497–498.) 8vo. *London, 1878*

Change of specific inductive of beeswax on solidifying.
—See also 3791, 3858.

3961. **Plush,** S. M. Edison's carbon telephone transmitter, and the speaking phonograph. (Journ. Franklin Instit., Vol. 75, pp. 266–271.) 8vo. *Philadelphia, 1878*

3962. **Preece,** (Sir) William Henry. On some physical points connected with the telephone. (Philos. Mag., Ser. V, Vol. 5, pp. 281–292.) 8vo. *London, 1878*

Amplitude of motion of the telephone diaphragm; electromotive force set up in surrounding coil.

3963.— —The phonograph. (Journ. Soc. Arts., Vol. 26, pp. 534–538.) 8vo. *London, 1878*

Notes of a lecture given at the Society of Arts.

3964.— —Recent advances in telegraphy. (Journ. Soc. Arts., Vol. 26, pp. 862–865.) 8vo. *London, 1878*

British Association paper: monopoly of telegraphs by the state. (See No. 3981.)

3964a.— —(The same paper.) (Journ. Soc. Arts, Vol. 27.) 35 pp. 8vo. *London, 1879*

The duplex and quadruplex systems of telegraphy.

3965.— —The telephone. (Proc. Roy. Instit., Vol. 8, pp. 501–507.) ill. 8vo. *London, 1878*
—See also 3556.

3966. **Rayleigh,** (John William Strutt). The explanation of certain acoustical phenomena. (Proc. Roy. Instit., Vol. 8, pp. 536–542.) 8vo. *London, 1878*

The experiments of Sondhauss.
—See also 3793.

3967. **Rowland,** Henry A(ugustus). (1848–1901.) Research on the absolute unit of electrical resistance. (Amer. Journ. Sc., Ser. III, Vol. 15, pp. 281–291+325–336+430–439.) 8vo. *New Haven, 1878*

History of the subject, theory of the method employed and results obtained.

3968. **Sabine,** Robert. (1837–1884.) Some electrical experiments with crystalline selenium. (Philos. Mag., Ser. V, Vol. 5, pp. 401–415.) 8vo. *London, 1878*

The electrical properties of selenium.

3969.— —Motions produced by dilute acids on some amalgam surfaces. (Philos. Mag., Ser. V, Vol. 6, pp. 211–216.) 8vo. *London, 1878*

Motions in certain electrolytic liquids in contact with mercury surfaces due to oxidation and deoxidation.
—See also 3315.

3970. **Shaw,** G. M. Sketch of Thomas Alva Edison. (Popular Science Rev., Vol. 13, pp. 487–491.) portr. 8vo. *New York, 1878*

3971. **Shoolbred,** James N(ugent). On the practical application of electricity to lighting purposes. (Journ. Soc. Arts, Vol. 27, pp. 31–37.) 8vo. *London, 1878*

Paper of general information.
—See also 2106, 4242.

3972. **Sprague,** John T. Electric lighting: its state and progress, and its probable influence upon gas interests. 22 pp. 8vo. *London, 1878*

The cost of electric lighting and its probable influence on gas interests.
—See also 1957.

3973. **Stevens Institute** of Technology. Annual announcement. 97 pp. ill. pl. 8vo. *Hoboken, 1878*

Brief history of the institution; photographs of apparatus in the department of physics.

3974. **Thomson,** (Sir) William (Lord Kelvin). (1824–1907.) On compass adjustment in iron ships. (Nature, Vol. 17, pp. 331–334.) 4to. *London, 1878*

New form of azimuth and steering compass.
—See also 2946.

3975. **Watt,** Alexander. (1823–1892.) The earth in danger. 32 pp. 12mo. *London, (1878?)*

The present condition of our globe with regard to coal supply.
—See also 1928.

3976. **Webb,** F(rederick) C(harles). (1828–1899.) (Notes) of my life. (Cover design and explanation.) 2 pp. ill. 8vo. *London, 1878*

Free hand sketch of electric symbolism.
—See also 3111.

3977. **Wills,** T(homas). Products of combustion in the electric arc. (Journ. Soc. Arts, Vol. 27, p. 74.) 8vo. *London, 1878*

Note on the products of combustion in the electric arc.

3978. D(avid) E(dward) **Hughes's** telephone, microphone and thermopile. (Engineer, Vol. 45, pp. 343–344.) Folio. *London, 1878*

Short illustrated descriptions.

3979. Ruhmkorff, Heinrich Daniel. (1803–1877.) (Engineering, Vol. 25, pp. 13–14.) Folio. *London, 1878*

Sketch of Ruhmkorff's life and work, (1803-1877).

3980. Ruhmkorff, Heinrich Daniel. (Obituary notice.) (Journ. Franklin Instit., Vol. 105, pp. 133–134.) 8vo. *Philadelphia, 1878*

Ruhmkorff was born in Hanover, 1803; lived in Paris from 1819; constructed his great coil in 1851 for which he received the prize of 50,000 francs at the French exhibition of 1858; he died in Paris, 1877.

3981. The post-office and recent advances in telegraphy. (Journ. Soc., Arts, Vol. 26, pp. 890–893.) 8vo. *London, 1878*

Strictures on Preece's paper entitled *Recent Advances in Telegraphy*. (See No. 3964.)

3982. Prometheus unbound; or Science in Olympus. (Punch's Almanack, 1878.) 4to. *London, 1878*

A cartoon.

3983. Table for calculating insulation resistances. Earth readings. 1 p. Sq. folio. (*London?*) *1878*

3984. Telegraphy without metallic conductors. (Engineering, Vol. 25, p. 13.) Folio. *London, 1878*

Experiments of M. Bourbouze in which the earth was used to conduct the current.

3985. Anderson, (Sir) James. (1824–1893.) Invitation to Latimer Clark's lecture on the electric light. *1879*

—See also 1816, 3906.

3986. André, George G. Application of electricity to the ignition of blasting charges. (Trans. Engineers' Soc., 1879, pp. 123–138.) 1 plate. 8vo. *London, 1879*

The igniting dynamo and other machines.

3987. Ayrton, W(illiam) E(dward). The improvements science can effect in our trades, and in the condition of our workmen. 16 pp. 6 plates. 8vo. *London, 1879*

The electric transmission of power; Edison's "chemical" telephone; Cowper's writing telegraph.

3988.——(The more important of the author's papers published up to Dec. 1870.) 2 pp. 8vo. *London, 1879*

—See also 3858.

3989. Barrett, (William Fletcher). Edison and some of his inventions. (Science Lectures, Ser. X, No. 5, pp. 73–94.) portr. ill. 12mo. *London, 1879*

The carbon telephone; subdivision of the electric light.

—See also 3489.

3990. Breguet, Antoine. (1851–1882.) Théorie de la machine de Gramme. (Ann. Chim. Pys., Ser. V, pp. 7–48.) 1 plate. 8vo. *Paris, 1879*

Theory of the Gramme machine based upon the magnetic circuit.

—See also 2186, 5620, 5703.

3991. **Chance,** James T. Dioptric apparatus in lighthouses for the electric light; with an extract of the discussion upon the paper. (Excerpt, Minutes Proc. Instit. Civil Engin., Vol. 57.) 29 pp. 1 plate. 8vo. *London, 1879*

Early paper on the electric illumination of lighthouses by a member of the firm of Chance Brothers, Birmingham.

3992. **Clark,** (Josiah Latimer). (1822–1898.) On the Birmingham wire-gauge. (Clark's Exeter paper of 1869; published with Report of the Committee of the Society of Telegraph Engineers on the Birmingham Wire Gauge), pp. 27–39. 1 plate. 8vo. *London, 1879*

Origin of the system; discrepancy of gauges. (See No. 3601.)
—See also 2897.

3993. **Cooke,** (Sir) William Fothergill. (1806–1879.) (Autobiography.) (Excerpt, Minutes Proc. Instit. Civil Engin.) 6 pp. 8vo. *London, 1879*

—See also 1011, 4986, 4991, 4994, 4995 bis *b*, 5016, 5134.

3994. **Crookes,** (Sir) William. Exhausted tubes and other apparatus illustrating various phenomena connected with molecular physics in high vacua. (Abstract of soirée of the Royal Society, Burlington House.) 3 pp. 8vo. *London, 1879*

Notes on experiments with high-vacuum tubes.

3995. ——On repulsion resulting from radiation. (Philos. Trans. Roy. Soc., Vol. 170, pp. 87–134.) ill. 4to. *London, 1879*

Contribution to the theory of the radiometer.

3996. ——On the illumination of lines of molecular pressure and the trajectory of molecules. (Philos. Trans. Roy. Soc., Vol. 170, pp. 135–164.) 1 plate. 4to. *London, 1879*

Classic paper dealing with the phenomena and theory of electric discharge in high vacua.

3997. ——Contributions to molecular physics in high vacua; magnetic deflection of molecular trajectory; laws of magnetic rotation in high and low vacua; phosphorogenic properties of molecular discharge. (Philos. Trans. Roy. Soc., Vol. 170, pp. 641-662.) 4to. *London, 1879*

Arguments in favor of the material nature of the cathodic discharge; a classic paper.

3998. ——The mechanical action of light. (Proc. Roy. Instit., Vol. 8, pp. 44–67.) 8vo. *London, 1879*

Paper leading to the theory of the radiometer; pressure due to light.
—See also 3389.

3999. **Delarge,** Fréderic. Note sur le téléphone appliqué dans le voisinage des lignes télégraphiques ordinaires. (Bull. Acad. Sc., Belgique, Ser. II, Vol. 47, pp. 34–47.) 8vo. *Brussels, 1879*

Inductive effects on telephone lines due to neighboring telegraph circuits.
—See also 1717.

4000. **Dewer,** James. Experiments in electro-photometry. (Proc. Roy. Instit., Vol. 8, pp. 565–567.) 8vo. *London, 1879*

Electric actions set up by light falling on fluid substances.

—See also 3777.

4001. **Douglass,** (Sir) James Nicholas. (1826–1898.) The electric light applied to lighthouse illumination. (Excerpt Minutes, Proc. Instit. Civil Engin.) 36 pp. 8vo. *London, 1879*

Cost and efficiency of oil, gas, and electricity as lighthouse illuminants.

—See also 4835.

4002. **Draper,** Harry Napier & R(ichard) J. **Moss.** Report on allotropism of selenium and of the influence of light on the electrical conductivity of this element. (Trans. Roy. Irish Acad., Vol. 26, pp. 231–248.) 4to. *Dublin, 1879*

The conductivity of selenium at different temperatures.

4003. **Edison,** Thomas Alva. The sonorous voltameter. (Proc. Amer. Ass. Adv. Sc., Vol. 27, p. 112.) 8vo. *Washington, 1879*

Brief description of the apparatus; its use in measuring the *e. m. f.* of batteries.

—See also 3931.

4004. **Ellis,** William. Description of the Greenwich "Time-Signal System." (Greenwich Observations, Appendix, 1879.) 13 pp. 4to. *Greenwich, 1879*

Description with illustrations of the mechanism employed for transmitting time signals.

4005.——On the relation between the diurnal range of magnetic declination and horizontal force, as observed at the Royal Observatory, Greenwich, during the years 1841–1877, and the period of solar spot frequency. (Trans. Philos. Roy. Soc., Vol. 171, pp. 541–560.) 3 plates. 4to. *London, 1879*

Discussion of the records show that the diurnal ranges of the magnetic elements are subject to an eleven-year period concomitant with that of sun-spot frequency.

4005a.——(The same paper.) Abstract. (Proc. Roy. Soc., Vol. 29, pp. 43–45.) 8vo. *London, 1879*

—See also 3344.

4006. **Exner,** Franz. Ueber die Ursache der Elektricitaetserregung beim Contact heterogener Metalle. (Sitz. Ber. Akad. Wiss. Math.-Nat. Kl., Vol. 80, pp. 307–327.) 8vo. *Vienna, 1879*

4006a.——(English translation.) The cause of the production of electricity by the contact of heterogeneous metals. Translated by J. Brown. (Philos. Mag., Ser. VI, Vol. 10, pp. 280–295.) 8vo. *London, 1880*

4007. **Field,** C(yrus) W(est). (1819–1892.) Ocean telegraphy. The 25th anniversary of the organization of the first company

ever formed to lay an ocean cable. March 10, 1879. 64 pp. 4to. *New York, 1879*
The twenty-fifth anniversary of the organization of the first Ocean-Cable Company; historical retrospect.
—See also 3021.

4008. **Flower,** Frank. A few remarks upon the various uses to which electricity can be practically turned to account in the house, etc. 9 pp. 8vo. *London, 1879*
Notes on the electric clock; electric lighting; an electric railway; ploughing by electricity.

4009. **Fontaine,** Hippolyte. Electric lighting. A practical treatise. Translated from the French by Paget Higgs. (Edinburgh Rev. 1879, pp. 289–321.) 8vo. *Edinburgh, 1879*
A review of the work.
—See also 3936.

4010. **Gordon,** J(ames) E(dward) (Henry). (1852–1893.) Measurements of electrical constants. No. II. On the specific inductive capacities of certain dielectrics. Part. I. (Philos. Trans. Roy. Soc., Vol. 170, pp. 417–446.) ill. 4to. *London, 1879*
Description of the author's apparatus for determining the dielectric constant with results obtained for paraffin, and various kinds of optical glass.
—See also 3689.

4011. **Gore,** G(eorge). Thermo-electric behaviour of aqueous solutions with mercurial electrodes. (Proc. Roy. Soc., Vol. 29, pp. 472–482.) ill. 8vo. *London, 1879*
Description of a liquid thermo-electric pair with details of experiments.
—See also 3022.

4012. **Hagemann,** G. A. On observations on the velocities of winds and on anemometers. (Quart. Journ. Meteorol. Soc., Vol. 5, pp. 203–213.) 4to. *London, 1879*

4013. **Hartley,** F(red.) W(illiam). The electric light. (Extract, Journ. Gas Lighting, 1878.) 12 pp. 8vo. *London, (1879?)*
The Wallace Farmer system of lighting.

4014. **Hitchcock,** Henry. Inviolability of telegrams. (Extract, Southern Law Rev., 1879.) 48 pp. 8vo. *St. Louis, 1879*
Review of the laws relating to the "privileged" character of telegraph messages.

4015. **Hockin,** C(harles) & H(erbert) A. **Taylor.** On the electromotive force of mercury alloys. (Journ. Soc. Telegr. Engin., Vol. 8, pp. 282–301.) 8vo. *London, 1879*
Effect of amalgamating the zinc in primary batteries.

4016. **Hopkinson,** John. (1849–1898.) On electric lighting. (Proc. Instit. Mech. Engin., 1879, pp. 239–249.) 8vo. *London, 1879*
The "characteristic curve" of the dynamo suggested.

4017.——On the torsional strain which remains in a glass fibre after release from twisting stress. (Proc. Roy. Soc., Vol. 28, pp. 148–154.) 8vo. *London, 1879*
The principle of superposition may be applied to the after-effects due to the torsion of a suspending fibre.
—See also 3877.

4018. **Hughes,** D(avid) E(dward). (1831–1900.) Experimental researches into means of preventing induction upon lateral wires. 4 pp. (Proof.) *London, 1879*

The static charge of a telegraph line; dynamic induction of neighboring wires.

—See also 3399.

4019. **Humblot.** Petit moteur hydraulic appliqué à l'appareil télégraphique Hughes. (Extract, Ann. Télégr., 1878.) 6 pp. ill. 8vo. *London, 1879*

Water-motor.

4020. **Jutier,** (P.). Note sur l'emploi de l'électricité pour le tirage des coups des mines. (Extract, Ann. Mines, 1879.) 35 pp. 8vo. *Paris, 1879*

Use of electricity in firing mines.

4021. **May,** W. R. The telephone, microphone and phonograph. (Phonographic Lecturer, 1879, pp. 257–268.) 12mo. *London, 1879*

Report of lecture in shorthand.

4022. **Moulton,** J(ohn) Fletcher. The verification of modern scientific theories. (Proc. Roy. Instit., Vol. 8, pp. 216–220.) 8vo. *London, 1879*

Remarks on the law of the conservation of energy.

4023.——Matter and ether. (Proc. Roy. Instit., Vol. 8, pp. 335–346.) 8vo. *London, 1879*

Critical remarks on the value of hypotheses in physical science.

—See also 4040.

4024. **Munro,** J(ohn). Laying a submarine cable. (Cassell's Family Mag., 1879, pp. 550–551.) 4to. *London, 1879*

Magazine article on the laying of a submarine cable.

—See also 3696.

4025. **Noble,** (Sir) (Andrew) & (Sir) F(rederic) (Augustus) **Abel.** (1827–1902.) Fired gunpowder. (Proc. Roy. Soc., Vol. 29, pp. 123–140.) 8vo. *London, 1879*

Energy realized in a gun by various kinds of powder.

—See also 2402, 3594.

4026. **Perry,** John & W(illiam) E(dward) **Aryton.** On the music of colour and visible motion. (Philos. Mag., Ser. V, Vol. 7, pp. 117–125.) 2 plates. 8vo. *London, 1879*

Combination of two harmonic motions.

4027.——A new theory of terrestrial magnetism. (Philos. Mag., Ser. V, Vol. 7, pp. 401–411.) 8vo. *London, 1879*

Theory of terrestrial magnetism based on Rowland's convection experiment of 1876.

4028.——On the practical solution of the most general problems in continuous beams. (Proc. Roy. Soc., Vol. 29, pp. 493–505.) 8vo. *London, 1879*

—See also 3791, 3858.

4029. **Preece,** (Sir) W(illiam) H(enry). Multiple telegraphy. (Proc. Roy. Instit., Vol. 9, pp. 194–200.) 8vo. *London, 1879*

4030.——The electric light. (Philos. Mag., Ser. V. Vol. 7, pp. 29–34.) 8vo. *London, 1879*

Relation between current, temperature and light.
—See also 3556.

4031. **Redwood,** (Theophilus). Electricity as a source of light. (Pharmac. Journ. & Trans., Vol. 9, pp. 593–598+633–637.) L. 8vo. *London, 1879*

4032. **Schwendler,** (Carl) L(ouis). (1838–1882.) Precis of a report on electric light experiments. (Proc. Asiat. Soc., Bengal, 1879, pp. 1–27.) 8vo. *Calcutta, 1879*

An appendix contains many results of scientific value obtained by experiment.
—See also 3516.

4033. **Serra-Carpi,** G(iuseppe). Sistema di trasmissione di dispacci telegrafici ad uso degli estranei alla telegrafia. 9 pp. 1 plate. 4to. *Rome, 1879*

Telegraph transmitter devised by the author.

4034. **Shettle,** R(ichard) C(harles). On spirality of the energy in a bar magnet. 8 pp. 8vo. *Reading, 1879*

Facts tending to show what the author calls the spiral motion of magnetic force.

4035.——On a new method of investigating the magnetic lines of force in magnets, demonstrating the obliquity of the equator and axis of bar magnets. (Proc. Roy. Soc., Vol. 29, pp. 102–105.) 8vo. *London, 1879*

4036. **Siemens,** (Sir) Charles William. (1822–1883.) The action of light on selenium. (Proc. Roy. Instit., Vol. 8, pp. 68–79.) 8vo. *London, 1879*

The author's conclusions are not in agreement with those of Prof. W. G. Adams. (See No. 3856.)
—See also 3107.

4037. **Sivewright,** (Sir) J(ames). South African telegraphs. (Journ. Soc. Arts, Vol. 27, pp. 430–437.) 8vo. *London, 1879*

Paper of general telegraphic interest.
—See also 4488, 4807.

4038. **Spice,** Robert Paulson. Electric lighting. 16 pp. 8vo. *London, 1879*

Reference to various systems of electric lighting.

4039. **Spottiswoode,** William. (1825–1883.) Experiments with a great induction coil. (Proc. Roy. Instit., Vol. 8, pp. 359–362.) 8vo. *London, 1879*

Description of the great "Spottiswoode induction-coil" (made by Apps); the secondary contains 280 miles of wire.
—See also 3797.

4040. **Spottiswoode,** W(illiam) (1825–1883) & J(ohn) F(letcher) **Moulton.**. On the sensitive state of electrical discharges through rarefied gases. (Philos. Trans. Roy. Soc., 1879, pp. 165–229.) 6 plates. 4to. *London, 1879*

Important research on the electric discharge through rarefied gases.
—See also 3797, 4022.

4041. **Stewart,** Balfour (1828–1887) & William **Dodgson.** Preliminary report to the Committee on Solar Physics on a method of detecting the unknown inequalities of a series of observations. (Proc. Roy. Soc., Vol. 29, pp. 106–123.) 8vo. *London, 1879*

Sun spots and the earth's magnetism.
—See also 3149.

4042. **Stone,** W(illiam) H(enry). The electric light. (Popular Science Rev., Vol. 18, pp. 25–38.) 1 plate. 8vo. *London, 1879*

Various generators and arc-lamp regulators; power derived from water-fall and used by Sir William Armstrong, p. 32.

4043.——The collapse of the electric light. (Popular Science Rev., Vol. 18, pp. 155–162.) 1 plate. 8vo. *London, 1879*

The conclusion reached is that for domestic purposes, the electric light "is neither so pleasant, so safe, so simple, or so manageable as the better forms of ordinary gas-lighting now universally adopted." This was written in 1879.

4044. **Thompson,** Silvanus P(hillips). Notes from the physical laboratory of University College. I. On the source of sound in the Bell telephone. II. On a new variety of magnetic figures. III. On the magnetic figures for demonstration. IV. On the magnetic behavior of fixed driven railing. V. Magnetic figures of three dimensions. (Philos. Mag., Ser. V, Vol. 8, pp. 129–136.) 8vo. *London, 1879*

4045.——Action of magnets on mobile conductors of currents. (Philos. Mag., Ser. V, Vol. 8, pp. 505–509.) 1 plate. 8vo. *London, 1879*

Action of magnets on liquid veins carrying currents.
—See also 3847.

4046. **Thomson,** (Sir) W(illiam) (Lord Kelvin). (1824–1907.) Electrodynamic qualities of metals. Part VII. Effects of stress on the magnetization of iron, nickel, and cobalt. (Philos. Trans. Roy. Soc., 1879, pp. 55–85.) 12 plates. 4to. *London, 1879*

Effect on induced magnetization of torsion and longitudinal stress.

4046a.——(The same paper.) Abstract. (Proc. Roy. Instit., Vol. 8, pp. 591–593.) 8vo. *London, 1879*

4047.——Terrestrial magnetism and the mariner's compass. (Good Words, Vol. 20, pp. 383–390+444–453.) L. 8vo. *London, 1879*

Gilbert's scientific work as shown in his *De Magnete.* (See No. 72.)
—See also 2946.

4048. **Tyndall,** John. (1820–1893.) The electric light. (Fortnightly Rev., New Ser., Vol. 25, pp. 197–216.) 8vo. *London, 1879*

Friday evening discourse at the Royal Institution, Jan. 17, 1879. "There exists no category of sciences to which the name of *applied science* could be given," p. 216.

4049.— —The optical condition of the atmosphere in its bearings on putrefaction and infection. (Proc. Roy. Instit., Vol. 8, pp. 6–27.) 8vo. *London, 1879*

The point of the lecture is that "life has never been proved to appear independently of antecedent life."

—See also 2950.

4050. **Walker,** C(harles) V(incent). (1811–1882.) On the unit of the Birmingham wire gauge. (Report on the Birmingham Wire Gauge by the Committee of the Soc. of Telegr. Engin.) 26 pp. 8vo. *London, 1879*

Reasons for a standard wire-gauge.

—See also 2811.

4051. **Waltenhofen,** A(dalbert Carl) von. Ueber die elektrische Uhr von G. Rebicek. (Abh. Boehm. Ges. Wiss., Vol. 10, No. 2, pp. 1–6.) 1 plate. 4to. *Prague, 1879*

Description of an electric clock.

—See also 3475.

4052. **Webber,** C(harles) E(dmund). Orders in the field and the means of communicating them. 26 pp. 8vo. *London, 1879*

Employment of telegraphs and telephones in military operations.

—See also 3748.

4053. **Wilde,** Henry. On some improved methods of producing and regulating electric light. (Proc. Liter. Philos. Soc., Manchester, Vol. 18, pp. 12–18+22–25.) 8vo. *Manchester, 1879*

The Jablochkoff candle.

—See also 3524.

4054. **Winter,** G. K. Electrical inter-communication in trains. 8 pp. 3 plates. 8vo. *Madras, 1879*

A strong, flexible cable passing through the links of the coupling-chains serves to connect electrically the cars of a train.

—See also 3711.

4055. **Edison** and his inventions. (Scribner's Monthly, Vol. 18, pp. 297–306+446–455.) 8vo. *London, 1879*

The paper treats of the principle of the carbon telephone-transmitter; also note on Cowper's writing telegraph.

4056. **Edison's** electro-chemical telephone. (Engineering, Vol. 27, pp. 238–240.) ill. Folio. *London, 1879*

An illustrated description.

4057. **Edison's** electro-motograph. (Scribner's Monthly, Vol. 18, pp. 154–155.) 8vo. *London, 1879*

Early loud-speaking telephone.

4058. **Edison's** system of fast telegraphy. (Scribner's Monthly, Vol. 18, pp. 840+846.) ill. 8vo. *New York, 1879*
Edison's automatic telegraph with illustrations.

4059. **Memoir** of Richard Secker Brough. 3 pp. 8vo. *1879*

4060. **Plan** of the East and West India docks. 1 map. Sq. folio. *London, 1879*
The plan of the docks is accompanied by a brief description.

4061. **South-Eastern Railway.** Diagram of train describers between Charing Cross and "A. B." signals including Cannon Street. Map 36x41 cm. *London, 1879*

4062. **Press** notices relating to Edison's loud-speaking telephone. *New York, 1879*
Notes from the *Times, Standard, Nature, New York Herald.*

4063. **Surgery** under the electric light. (Medical Press and Circular, 1879, pp. 245–247.) 4to. *London, 1879*
Jablochkoff candle recommended.

4064. **A visit** to Professor Edison. (Times, Vol. I, pp. 100–105.) 8vo. *London, 1879*

4065. **Garratt,** B. Copson. Mental and physical maladies. 16 pp. 12mo. *London, (187–)*
The stimulating effect of magnetic influence.
—See also 2143, 4124, 5633, 5810.

4066. School of Submarine and Military Telegraphy and of Technical Scientific Instruction. (Principal T. J. Jones.) 3 pp. 4to. *London, 187–)*
Notice of removal.

4067. **Telephone** Training School. (Principal Charles E. Winter.) Circular. 3 pp. 8vo. *London, (187–)*

4068. **Abney,** W(illiam) de W(iveleslie). Traps to catch sunbeams. (? pp. 45–63.) ill. 12mo. *1880*
Solar radiation and some methods of registering it.

4069. **Anderson,** Richard. On the necessity for a regular inspection of lightning conductors. 10 pp. 8vo. *London, 1880*
Instances of danger caused by inefficient conductors.
—See also 3907.

4070. **Axon,** William E(dward) A(rmitage). On the history of the word telegraph. (Proc. Liter. Philos. Soc., Manchester, Vol. 19, pp. 182–184.) 8vo. *Manchester, 1880*
The introduction of the word telegraph said to be due to **Claude Chappe.**

4071.— —On some early anticipations of heliographic signalling. (Proc. Liter. Philos. Soc., Manchester, Vol. 20, pp. 46–50.) 8vo. *Manchester, 1880*
Traced back to 1511.
—See also 3857.

4072. **Ayrton,** W(illiam) E(dward). The future of mechanic's institutions. 4 pp. 8vo. (*Manchester?*) *1880*

Remarks on technical institutions.
—See also 3858.

4073. **Ayrton,** W(illiam) E(dward) & John **Perry.** Determination of the acceleration of gravity for Tokyo, Japan. (Philos. Mag., Ser. V, Vol. 9, pp. 292–301; Vol. 10, pp. 43–53.) 8vo. *London, 1880*

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—See also 3791, 3858.

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Experiments to determine whether the electrometer method of measuring the resistance of liquids is independent of polarization.
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4224. **Glover,** Walter T. & Co. Table showing the relative dimensions, lengths, resistances and weights of pure copper-wire. 1 p. Sq. folio. *Manchester, 1883*

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—See also 3689.

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The conclusion reached is that tempered steel has the characteristics of a true alloy.
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4231. **Jewesbury,** H. W. Short history of the introduction of gutta-percha into Europe. 15 pp. 1 plate. 8vo. *London, 1883*

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—See also 2387, 4275.

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4236.——The soaring of birds. (Nature, Vol. 27, pp. 534–535.) 8vo. *London, 1883*

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4238. Reynier, Emile. La traction électrique par accumulateurs appliquée aux tramcars de Paris. (L'Electricien, Vol. 6, pp. 193–204+241–250.) ill. 8vo. *Paris, 1883*

Some points relating to economy of working and to general theory of electric traction.

4239.——Sur la mesure des forces électromotrices. (Cosmos-les Mondes, Ser. III, Vol. 6, pp. 535–540.) ill. 8vo. *Paris, 1883*

Table showing the e. m. f. of various combinations; the author's battery.

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4240. Sabine, Robert. (1837–1884.) On a wedge- and diaghragmphotometer. (Philos. Mag., Ser. V, Vol. 15, pp. 22–28.) 8vo. *London, 1883*

"A selected area of the bright part of a paraffin flame would be a much better unit of light than the present standard candle," p. 28.

—See also 3315.

4241. Sennett, A(lfred) R(ichard). Ayrton and Perry's dispersion photometer. 4 pp. ill. 8vo. *1883*

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—See also 4283.

4242. Shoolbred, James N(ugent). The measurement of electricity. (Journ. Soc. Arts, Vol. 31, pp. 497–508.) 4to. *London, 1883*

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4243. Siemens, (Sir) Charles William. (1822–1883.) The electrical transmission and storage of power. (Extract, Practical Applications of Electricity, pp. 56–80.) ill. 8vo. *London, 1883*

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4243a.——(The same paper.) 27 pp. 1 plate. 8vo. *London, 1883*

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The two systems based on the inch and the millimeter.

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4246. **Thwaite,** B. H. A hygienic comparison between the light of electricity and that of coal gas. (Extract, Journ. Gas Lighting, Vol. 41.) 4 pp. 8vo. *London, 1883*
Electric light and vegetation.

4247. **Wilkinson,** G. A. Catalogue of sale of furniture, books, etc., at the "Chesterton House" Plaistow (the residence of the late W. T. Henley.) 20 pp. 4to. *London, 1883*

4248. **The Ball** unipolar dynamo-electric machine as made by the Ball Electric Light Co. (Engineering Rev., Vol. 4, p. 122.) 4to. *London, 1883*

4249. **Diagrams** of Francis Ronalds' telegraph. (Printed from the original copper plates.) (Electrician, Vol. 12, Suppl. No. 4.) Folio. *London, 1883*
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4251. **Electricity** free of cost. A practical solution of a practical problem. (To-day, Vol. 1, pp. 523–550.) 8vo. *London, 1883*
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4252. **Siemens,** Sir Charles William. (Funeral service of Sir Charles William Siemens at Westminster Abbey, Nov. 26th, 1883. A memorial card.) *London, 1883*

4253. **Map** of Manitoba, Alberta, etc. (100x132 cm.) *Alberta, 1883*

4254. **Varley,** Cromwell Fleetwood. In memoriam, Sept. 2nd, 1883. (A mortuary card.) *New York, 1883*

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4256. **Ayrton,** W(illiam) E(dward) & John **Perry.** A new form of spring for electric and other measuring instruments. (Proc. Roy. Soc., Vol. 36, pp. 297–319.) ill. 8vo. *London, 1884*
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4257. **Beeman,** J. S. Diagram for finding the sectional area of electric conductors. (Engineer, Vol. 58, p. 394.) Folio. *London, 1884*

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4258. **Blavier,** E(douard) E(rneste). (1826–1887.) Étude sur les courants telluriques. 30 pp. Courbes fournies par les courants telluriques. 40 pp. 4to. *Paris, 1884*

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4259. **Buckney,** F. Scheme for small screw threads, such as are used in electrical and telegraphic apparatus, in clockwork, etc. (Refers to article in Report, British Ass. Adv. Sc., 1884, pp. 287–293.) 4 pp. 8vo. (Uncorrected proof copy.) *1884*

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4261. **Christie,** W(illiam) H(enry) M(ahoney). Report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich. 15 pp. 4to. *Greenwich, 1884*

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—See also 2897.

4263. **Forbes,** George. On the relation which ought to subsist between the strength of an electric current and the diameter of conductors, to prevent overheating. (Journ. Soc. Telegr. Engin., Vol. 13, pp. 232–262.) 8vo. *London, 1884*

Numerous tables, formulae, etc.
—See also 4292, 4342.

4264. **Glazebrook,** R(ichard) T(etley), J. M. **Dodds** & E. B. **Sargent.** Experiments on the value of the British Association Unit of resistance. (Philos. Trans. Roy. Soc., Vol. 174, pp. 223–268.) ill. 4to. *London, 1884*

Detailed description of apparatus used.

4265. **Gore,** G(eorge). Some relations of heat to voltaic and thermo-electric action of metals in electrolytes. (Abstract.) (Proc. Roy. Soc., Vol. 36, pp. 50–55.) 8vo. *London, 1884*

The thermo-electric action of a series of metals in particular liquids.

4266.——On some relations of chemical corrosion to voltaic current. (Proc. Roy. Soc., Vol. 36, pp. 331–340.) 8vo. *London, 1884*

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—See also 3022.

4267. **Hagenbach-Bischoff,** (Jacob) E(duard). Determination de la vitesse de propagation de l'électricité dans les fils télégraphiques. (Arch. Sc. Phys. Nat., Ser. III, pp. 476–482.) 8vo. *Geneva, 1884*

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—See also 1834.

4268. **Hopkinson,** John. (1849–1898.) Some points in electric lighting. (Lectures at Institution of Civil Engineers, Vol. 1, pp. 81–106.) ill. 8vo. *London, 1884*

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—See also 3877.

4269. **Houston,** E(dwin) (James). Notes on phenomena in incandescent lamps. (Extract, Proc. Amer. Instit. Electr. Engin., Vol. 1.) 8 pp. ill. 8vo. *New York, 1884*

The "Edison" effect.

4270.——Synchronism. (Extract, Proc. Amer. Instit. Electr. Engin., Vol. 1.) 11 pp. 8vo. *New York, 1884*

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—See also 2438, 4296, 4306.

4272. **Hughes,** D(avid) E(dward). (1831–1900.) On the physical condition of iron and steel. (Proc. Instit. Mechan. Engin., 1884, pp. 36–60.) 3 plates. 8vo. *London, 1884*

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—See also 3399.

4273. **Jamieson,** Andrew. Electric lighting for steamships. (Excerpt, Minutes Instit. Civil Engin., Vol. 79.) 19 pp. 8vo. *London, 1884*

—See also 4133.

4274. **Mance,** (Sir) Henry C. On a method of eliminating the effects of polarization and earth currents from fault tests. With remarks by Josiah Latimer Clark. (Journ. Soc. Telegr. Engin., Vol. 13, pp. 328–359.) 8vo. *London, 1884*

Mathematics of the method, p. 17.

—See also 4658.

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—See also 4232.

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4277.——On the expression of electrical resistance in terms of a velocity. (Trans. St. Louis Acad. Sc., Vol. 4, pp. 535–536.) 8vo. *St. Louis, 1884*

Mathematical note on electrical resistance considered as a velocity.
—See also 3834.

4278. **Parnell,** Arthur. The action of lightning strokes in regard to the metals and chimneys of buildings. 3 pp. 4to. *London, 1884*

Condemns the use of lightning rods. Discharging property of points said to nave been discovered by Thomas Hopkinson, an American, in 1747, who communicated his discovery to Franklin. (Abstract of paper to be read at the Roy. Instit. of British Architects.)
—See also 2294.

4279. **Pole,** William. (1814–1900.) Sir William Siemens. (Excerpts, Minutes Proc. Instit., Civil Engin.) 21 pp. 8vo. *London, 1884*
—See also 2966.

4280. **Poynting,** J(ohn) H(enry). On the transfer of energy in the electromagnetic field. (Philos. Trans. Roy. Soc., Vol. 175, pp. 343–361.) 4to. *London, 1884*

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4281. **Proctor,** Richard A(nthony). (1837–1888.) Earthquakes in England. (Longmans's Mag., Vol. 4, pp. 382–392.) 8vo. *London, 1884*

From A. D. 974 to 1884, a popular account of earthquakes.
—See also 3889.

4282. **Rayleigh,** (John William Strutt) & H. **Sidgwick.** On the electro-chemical equivalent of silver and on the absolute electromotive force of Clark cells. (Philos. Trans. Roy. Soc., Vol. 175, pp. 411–460.) 1 plate. 4to. *London, 1884*

Paper of historic as well as practical interest, suggestive of theory and methods of working.
—See also 3793.

4283. **Sennett,** Alfred Richard. On the electric light. (Excerpt Minutes Proc. Instit. Civil Engin., 1884.) 25 pp. ill. 8vo. *London, 1884*

Some points in the physics of the electric arc.
—See also 4241.

4284. **Wright,** C(harles) R(omley) & C(harles) **Thompson.** On the determination of chemical affinity in terms of electro-motive force. (Proc. Physic. Soc., Vol. 5, pp. 257–283.) 8vo.
London, 1884

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4285. **Comparison** of the numbers and sizes of the new legal standard wire gauge with previously known numbers and sizes of the Birmingham wire gauge with their values in 1000ths of an inch. 1 p. Folio. *Leeds, 1884*

4286. **Curiosities** of the electric light. (Chambers' Journ., 1884, pp. 140–143.) 4to. *London, 1884*

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4289. **(Sketch** of the career of Edward Davy, with note on his telegraph inventions.) (Electrician, Vol. 12, pp. 196–197.) Folio.
London, 1884

4290. **Blavier,** E(douard) E(rneste). (1826–1887.) Influence des orages sur les lignes souterraines. (Ann. Télégr., Vol. 12, pp. 177–182.) 8vo. *London, 1884*

The author finds that when the "ground" is good, underground electric conductors are not influenced by charged clouds, thunderstorms, etc. The same applies to submarine cables. (Autograph copy.)
—See also 3431.

4291. **Bottomley,** J(ames) T(homson). On the electric resistance of a new alloy named platinoid. (Proc. Roy. Soc., Vol. 38, pp. 340–344.) 8vo. *London, 1885*

Platinoid is German silver with a small percentage of tungsten; it is but little affected by changes of temperature.
—See also 2020.

4292. **Forbes,** George. Cantor lectures. Distribution of electricity. (Soc. Encour. Arts, Manufact., Commerce.) 35 pp. ill. L. 8vo. *London, 1885*

—See also 4263.

4293. **Forrest,** James. "The electrical regulation of the speed of steam engines and other motors for driving dynamos" by Mr. P. W. Williams. (Paper to be read at the seventeenth ordinary meeting of the Institute of Civil Engineers.) 1 p. 8vo.
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4294. Harcourt, A(uguste) G(eorge) Vernon. Photometry by the pentane standard. (Extract, Journ. Gas Lighting, Vol. 46.) 2 pp. Folio. *London, 1885*

General considerations on the photometry of intense sources of light.

4295. Hopkinson, John. (1849–1898.) Magnetisation of iron. (Philos. Trans. Roy. Soc., 1885. pp. 455–469.) 7 plates. 4to. *London, 1885*

This important contribution to our knowledge of the behavior of iron under magnetizing forces is illustrated by tables of results, plotted curves, etc.
—See also 3877.

4296. Houston, (Edwin) J(ames). The electrical determination of the velocity of projectiles. (Journ. Franklin Instit., Ser. III, Vol. 90, pp. 134–146.) ill. 8vo. *Philadelphia, 1885*

Details of an electro-ballistic pendulum; various chronographs.

4297. ——Delany's system of facsimile telegraphy. (Journ. Franklin Instit., Ser. III, Vol. 90, pp. 438–448.) ill. 8vo. *Philadelphia, 1885*
—See also 4269.

4298. Imray, John. High speed motors. (Excerpt, Minutes Proc. Instit. Civil Engin.) 19 pp. 8vo. *London, 1885*

General principles discussed, diagrams and formulae.

4299. Kapp, Gisbert. Modern continuous-current, dynamo-electric machines and their engines. (Excerpt, Minutes Proc. Instit. Civil Engin.) 31 pp. 2 plates. 8vo. *London, 1885*

Lengthy paper containing theoretical and practical considerations.
—See also 2411, 4345.

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The question discussed is "whether it is the human voice one hears in the telephone;" discussion by Lord Rayleigh, Prof. Ryan and Dr. M. F. O'Reilly.

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An electrical governor for engines used in electric installations.

4302. Perkins, Charles A. On the variation of the magnetic permeability of nickel at different temperatures. (Amer. Journ. Sc. Ser. III, Vol. 30, pp. 218–231.) 8vo. *New Haven, 1885*

Original experiments compared with those of previous investigators.

4303. Rayleigh, (John William Strutt). On the Clark cell as a standard of electro-motive force. (Philos. Trans. Roy. Soc., 1885, pp. 781–800.) 4to. *London, 1885*

"The result of a large experience is very favorable to the trustworthiness of the cells, if reasonable precautions be observed in charging them," p. 781.
—See also 3793.

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4304bis. **Weaver,** William Dixon. Incandescent lamp economy. (Van Nostrand's Engrg. Mag., March, 1885. Electrician and Electrical Engineer, September, 1885.)—Speed trials and an apparatus for accurately recording revolutions and time on the measured mile. (Journal Am. Soc. Naval Engineers, February, 1891.)—Electrical counter and shaft revolution and direction indicator (Proceedings U. S. Naval Institute, 1891).—Indicator tests. (Journal Am. Soc. Naval Engineers, August, 1891.)
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Two papers on the relation between the voltage, current, candle-power and efficiency of incandescent lamps. Other papers describe electrical apparatus designed and constructed for naval purposes.

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Birmingham, 1886
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—See also 3022.

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Philipp Reis, the inventor of the articulating telephone.
—See also 4269.

4307. **Kohlrausch,** Friedrich (Wilhelm Georg) & Wilhelm **Kohlrausch.** Das elektrochemische Aequivalent des Silbers; zugleich eine experimentelle Pruefung erdmagnetischer Intensitaetsmessungen. (Ann. Phys. Chem., New Ser., Vol. 27, pp. 1–59.) ill. 8vo. *Leipzig, 1886*
Details of the research on the electrochemical equivalent of silver, 1886.
—See also 3548.

4308. **Nipher,** Francis E(ugene). Report on magnetic determinations in Missouri, summer of 1878–1879. (Trans. St. Louis Acad. Sc., Vol. 4, pp. 81–101+121–144.) 1 plate. 8vo. *St. Louis, 1886*
Measurements of declination, dip, and horizontal force.

4309.——On certain problems in refraction. (Trans. St. Louis Acad. Sc., Vol. 4, pp. 325–350.) ill. 8vo. *St. Louis, 1886*
Notes of a magnetic survey of the State of Missouri.

4310.——On a property of the isentropic curve for a perfect gas as drawn upon the thermodynamic surface of pressure, volume, and temperature. Also, Magnetic survey of Missouri, IV., annual report. (Trans. St. Louis Acad. Sc., Vol. 4, pp. 407–410.) 8vo. *St. Louis, 1886*
Equation of thermodynamic surface and its development.
—See also 3834.

4311. **Perry,** John. Telpherage, a lecture delivered at the London Institution, Jan. 24, 1886. 50 pp. ill. pl. 8vo. *London, 1886*
History and practice of automatic transportation with numerous illustrations. (Autograph copy.)
—See also 3791.

4312. Priorité de la lampe à incandescence. Affaire Somzée-Edison. Discussion de la réponse de M. Picard à la communication faite par M. Evrard sur les origines Belges de la lampe à incandescence. (Extract, Bull. Soc. Belge d'Electr. 1886.) 10 pp. 4to. *Brussels, 1886*

It is claimed that M. Jobard of Brussels was the first to express (1838) the idea that a carbon filament in vacuo would emit light when traversed by a current.

4313. School of Submarine Telegraphy and Electrical Engineering, London. 24 pp. ill. pl. 4to. *London, 1886*

Paper by William Lant Carpenter on electrical engineering as a profession and how to prepare for it.

4313a.——(The same paper.) 4to. *London, 1888*

4314. Cuttriss, Charles. Recent improvements in apparatus for ocean cabling. (Trans. Amer. Instit. Electr. Engin., Vol. 5, pp. 7–21; Discussion on the paper, Vol. 5, pp. 25–34.) 8vo. *New York, 1887*

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—See also 3022.

4316. Hopkinson, Edward. Electrical tramways; the Bessbrook and Newry tramway, with an abstract of the discussion upon the paper, edited by James Forrest. 28 pp. pl. 8vo. *London, 1887*

Line between Bessbrook and Newry and its equipment.

4317. Lockwood, Thomas D. On the siphon recorder and cable telephony. (Trans. Amer. Instit. Electr. Engin., Vol. 5, pp. 21–25; Discussion, pp. 25–34.) 8vo. *New York, 1887*

—See also 2285.

4318. Preece, (Sir) (William) H(enry). Jubilee of the telegraph. (Blackfriars Mag., 1887, pp. 1–6+65–71+113–123+162–169.) 8vo. *London, 1887*

Brief historical sketch with statistics.

—See also 3556.

4319. Tobler, A(dolf). Ueber aeltere und neuere Methoden zur Pruefung von Unterseekabeln waehrend der Legung. (Electrotechn. Zeitschr., Year 8, pp. 437–442+539–546.) ill. 4to. *Berlin, 1887*

Testing submarine cables. (Autograph copy dedicated to Latimer Clark.)

4320. (Cartoon commemorative of the jubilee year (1887) of the electric telegraph in England, with figures of Faraday, Cooke and Wheatstone.) 1 p. Folio. *London, 1887*

4321. **The Phonopore,** (Langdon-Davies). (The Times, Febr. 26, 1887.) 1 p. Folio. *London, 1887*

4322. **Ayrton,** W(illiam) E(dward) & John **Perry.** The efficiency of incandescent lamps with direct and alternating currents. (Philos. Mag., Ser. V, Vol. 25, pp. 476–482.) 8vo. *London, 1888*

It is shown that the efficiency of an incandescent lamp is the same for both direct and alternating currents.

4323.——The magnetic circuit of dynamo-machines. (Philos. Mag., Ser. V, Vol. 25, pp. 496–510.) 1 plate. 8vo. *London, 1888*

The characteristic curve of a dynamo discussed.
—See also 3791, 3858.

4324. **Gore,** G(eorge). Effect of chlorine on the electro-motive force of a voltaic couple. (Proc. Roy. Soc., Vol. 44, pp. 151–152.) 8vo. *London, 1888*

The *e. m. f.* is found to increase within a certain limit by the addition of chlorine.

4325.——A method of detecting dissolved chemical compounds and their combining proportion. (Abstract.) (Proc. Roy. Soc., Vol. 45, pp. 265–267.) 8vo. *London, 1888*

The paper in the Proceedings of which this is merely an abstract contains diagram of the author's "voltaic balance."

4326.——Relative amounts of voltaic energy of electrolytes. (Abstract). (Proc. Roy. Soc., Vol. 45, p. 268.) 8vo. *London, 1888*

Upwards of 1,000 aqueous solutions were examined.
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4327. **Grubb,** (Sir) Howard. New arrangement of electrical control for driving clocks of equatorials. (Monthly Notices Roy. Astronom. Soc., Vol. 48, pp. 352–356.) 1 plate. 8vo. *London, 1888*

Drawings and details of construction given.
—See also 4083.

4328. **Macalay,** James. James Clerk Maxwell. (New Biographic Series, Series No. 14.) 16 pp. 8vo. *London, (1888?)*

Clerk Maxwell, from the religious view-point.

4329. **Nipher,** Francis E(ugene). The Volt, the Ohm and the Ampère. (Journ. Ass. Engin. Soc., Vol. 7, pp. 83–89.) ill. 8vo. *New York, 1888*

Discussion of the practical electrical units.
—See also 3834.

4330. **Preece,** (Sir) W(illiam) H(enry). Safety lamps in collieries. (Blackfriar's Mag., 1888, pp. 49–57.) 8vo. *London, 1888*

Function of the Davy lamp popularly explained.
—See also 3556.

4331. **Thompson,** Silvanus P(hillips). On the price of the factor of safety in the materials for lightning-rods. (Philos. Mag., Ser. V, Vol. 25, pp. 170–171.) 8vo. *London, 1888*

The argument is in favor of iron for lightning rods.

4332.——On the formulae of Bernoulli and of Haecker for the lifting of magnets. (Philos. Mag., Ser. V, Vol. 26, pp. 70–73.) 8vo. *London, 1888*

It is shown that the lifting-power of magnets is proportional to the polar surface.

4333.——Note on continuous current transformers. (Philos. Mag., Ser. V, Vol. 26, pp. 157–162.) 8vo. *London, 1888*

Certain effects common to continuous current and alternate-current transformers.

4334.——Note on the conditions of self-excitation in a dynamo machine. (Philos. Mag., Ser. V, Vol. 26, pp. 469–475.) 8vo. *London, 1888*

The fundamental equation is established and various dynamo phenomena discussed.

—See also 3847.

4335. **Tomlinson,** Herbert. The temperature at which nickel begins to lose suddenly its magnetic properties. (Philos. Mag., Ser. V, Vol. 25, pp. 372–379.) 8vo. *London, 1888*

The author finds that the temperature at which the permeability of nickel vanishes depends on the magnetizing.

4336. **A talk** on telegraphic topics. (Telegraphic statistics.) 52 pp. 8vo. *New York, (1888?)*

4337. **Rawson,** Frederic Lawrence. Memoir. (Manufacturer and Inventor, May 15, 1888.) 1 p. portr. Folio. *London, 1888*

4338. **(Sketch** of life and work of Sir Charles Tilston Bright.) (Excerpt, Minutes Proc. Instit. Civil. Engin., Vol. 93.) 9 pp. 8vo. *London, 1888*

4339. **Detail** of establishing and working a standardizing laboratory. 6 pp. L. folio. *(London, 1888?)*

4340. **Ayrton,** W(illiam) E(dward) & John **Perry.** Testing the power and efficiency of transformers. (Journ. Soc. Telegr. Engin., Vol. 17, pp. 157–176; Additional note added April, 1888.) ill. 8vo. *London, 1889*

Calorimetric method of testing transformers.

—See also 3791, 3858.

4341. **Clark,** (Josiah) Latimer.—Letter from Sir Michael Foster, Secretary of the Royal Society, informing Mr. Clark of his election as Fellow, June, 1889. *1889*

4342. **Forbes,** George. Formulae for converters. (Journ. Soc. Telegr. Engin., Vol. 17, pp. 153–156.) 8vo. *London, 1889*

—See also 4263.

4343. **Gore,** G(eorge). Relative amounts of voltaic energy of dissolved chemical compounds. (Abstract.) (Proc. Roy. Soc., Vol. 45, p. 442.) 8vo. *London, 1889*

Upwards of 250 aqueous solutions of dissolved chemical compounds examined.

4344.——On the rate of decomposition of chlorine-water by light. (Abstract.) (Proc. Roy. Soc., Vol. 46, pp. 362–363.) 8vo. *London, 1889*

Diffused daylight and direct sunlight used.
—See also 3022.

4345. **Kapp,** Gisbert. On alternate-current transformers with special reference to the best proportion between iron and copper. (Journ. Soc. Telegr. Engin., Vol. 17, pp. 96–119; Discussion, pp. 156–238.) ill. 8vo. *London, 1889*

—See also 4299.

4346. **Mackenzie,** J. Kenneth D. The distribution of electricity by means of secondary generators or transformers. (Journ. Soc. Telegr. Engin., Vol. 17, pp. 120–153; Discussion, pp. 156–238.) ill. 8vo. *London, 1889*

(Autograph copy.)

4347. **Mond,** Ludwig & Carl **Langer.** A new form of gas battery. (Proc. Roy. Soc., Vol. 46, pp. 296–304.) ill. 8vo. *London, 1889*

4348. **Perry,** John. On mechanical engineering in electrical industries. 24 pp. 2 plates. 8vo. *London, 1889*

—See also 3791.

4349. **Thompson,** Silvanus P(hillips). Optical torque. (Extract, Proc. Roy. Instit., 1889.) 24 pp. ill. 8vo. *London, 1889*

The polarization of light with description of some polarizing apparatus.

4350.——The deduction of the elementary theory of lenses and mirrors from wave principles. (Philos. Mag., Ser. V, Vol. 28, pp. 232–248.) 8vo. *London, 1889*

The author shows how the elementary theory of lenses and mirrors can be deduced from the wave theory.
—See also 3847.

4351. **City** and guilds of London Institute for the advancement of technical education. City technical science classes. Philip Magnus, Director. 3 pp. 4to. *London, (188–)*

4352. **Bramwell,** (Sir) Frederick (Joseph). (1818–1903.) The application of electricity to welding, stamping and other cognate purposes. (Excerpt, Minutes Proc. Instit., Civil Engin., Vol. 202.) 39 pp. 8vo. *London, 1890*

At the date of the paper (1890) the application of electricity to welding was comparatively new.
—See also 4216.

4353. **Chrystal,** George. Letter addressed to Prof. Fitzgerald. (Electrician, Vol. 25, p. 309.) ill. 8vo. *London, 1890*

Note on Ohm's law and the bridge method of determining the resistance-function E/C.
—See also 2187.

4354. **Fawcus,** William Paul James & Edward Woodrowe **Cowan.** The Keswick water-power electric light station. With an abstract of the discussion upon the paper, edited by James Forrest. (Excerpt, Minutes Proc. Instit. Civil Engin.) 13 pp. 1 plate. 8vo. *London, 1890*

This was the first attempt in England to utilize water-power for the public supply of electric light.

4355. **Gore,** G(eorge). Examples of "Solution-compounds." (Proc. Birmingham Philos. Soc., Vol. 7, pp. 33–42.) 8vo. *Birmingham, 1890*

The term "solution-compound" is applied to denote substances which exist only while dissolved in water.

4356. ——On a new method and department of chemical research. (Philos. Mag., Ser. V, Vol. 29, pp. 401–427.) 8vo. *London, 1890*

Method for determining the variation of electromotive forces with variation of concentration of the solution in primary cells.

—See also 3022.

4357. **Lodge,** (Sir) Oliver (Joseph). The Leeds meeting of the British Association from the point of view of section A. (Electrician, Vol. 25, pp. 573–577.) 8vo. *London, 1890*

Remarks on the B. A. unit of resistance, and on Ewing's "induction of magnetism."

—See also 3827.

4358. **Preece,** (Sir) W(illiam) H(enry). On the character of steel used for permanent magnets. (Electrical Rev., Vol. 27, pp. 305–307.) ill. Folio. *London, 1890*

The magnetometer method of testing was used; results of the tests are given.

4359. ——On the form of submarine cables for long distance telephony. (Electrical Rev., Vol. 27, pp. 309–311.) ill. Folio. *London, 1890*

The telephone cable referred to is the one between Dover and Calais. The principal articles of the specification are given.

4360. ——The sanitary aspects of electric lighting. (Extract, Trans. Sanitary Instit., Vol. 11.) 14 pp. 8vo. *London, 1890*

—See also 3556.

4361. **United States,** Naval Observatory. Report of the superintendent for 1890. (Report, Secr. Navy, 1890, pp. 92–103.) 8vo. *Washington, 1890*

Brief report on the magnetic work of the year.

4362. **Backhouse,** T(homas) W(illiam). The structure of the sidereal universe. 21 pp. 3 maps. 4to. *Sunderland, 1891*

4363. **Ellis,** William. On the diurnal variations of magnetic elements, as depending on the method of tabulation. (Philos. Mag., Ser. V, Vol. 31, pp. 36–41.) ill. 8vo. *London, 1891*

The comparison includes the declination, the horizontal force, and the vertical force.

—See also 3344.

4364. **Varley,** S(amuel) Alfred. Is science disciplined knowledge, or is it something else? (Electrical Rev., Vol. 28, pp. 4–6+44–48+96.) 8vo. *London, 1891*
The author is disposed to think "that the student would find the writings of Lodge and Thomson a mental exercise and very little more, whereas they could not possibly read the writer's contributions without obtaining some knowledge of the laws that govern physical phenomena," p. 12.
—See also 3109.

4365. **Smithsonian Institution.** Smithsonian meteorological tables. (Smithsonian Misc. Coll., No. 844.) 59 pp. tab. 8vo. *Washington, 1893*
Thermometric, barometric, hygrometric and geodetic tables.

4366. **Greenwich,** Royal Observatory. Reduction of Greenwich meteorological observations. Part III. Temperature of the air as determined from the observations and records of the fifty years 1841–1890 made at the Royal Observatory, Greenwich, now collected under the direction of W. H. M. Christie. xiv+119 pp. pl. 4to. *London, 1895*
The discussion as well as the preparation of the tables was carried out under the superintendence of William Ellis, F. R. S.
—See also 2893.

4367. **Hipkins,** W. E. Wire rope and its applications. v. pp. ill. pl. 4to. *Birmingham, 1896*
Colored illustrations showing application to aerial cableways, wire-rope driving, underground haulage, suspension bridges, preceded by historical sketch.

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4368. **Bravais,** A(uguste) (1811–1863) & C. B. **Lilliehook.** (1809–1890.) Variations de la déclinaison magnétique, observées avec le magnétomètre. 33 pp. 1 plate. 8vo.
Observations on the variation of magnetic declination.
—See also 2845.

4373. **India—Electric Telegraph Department.** Examination papers. 7 l. Folio.
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—See also 2933.

4382. **Walker,** Charles V(incent). (1811–1882.) Electric telegraph manipulation. 107 pp. ill. 12mo. *London, 1850*
—See also 2811.

4383. **Electric and International Telegraph Company.** General regulations for the conduct of the Company's business at stations. 34 pp. Folio. *London, (1851)*
—See also 4394, 4403, 4411, 4415, 4429, 4447, 4531, 4541, 4565, 4670, 4681, 5034, 5223.

4384. **Electric Telegraph Company.** General orders, rules, and regulations. 58 pp. 16mo. *London, 1851*

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4409. **Wheatstone,** (Sir) Charles. (1802–1875.) Description of the automatic printing telegraph. (Comptes rendus Acad. Sc., 1859, Vol. 48, pp. 215–220.) ill. 4to. *London, 1859*

—See also 2585.

4410. **Inverness and Aberdeen Junction Railway.** Regulations for working the electric telegraph. 8 pp. 16mo. *Inverness, (185–)*

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—See also 4383.

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—See also 1830.

4413. **London and North Western Railway.** Rules and regulations for the conduct of the traffic, and for the guidance of the officers and men in the service of the London and North Western Railway Company. 142 pp. 16mo. *London, 1860*
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—See also 4417, 4538, 4561, 4573, 4576, 4593, 4623, 4687.

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—See also 4383.

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—See also 3372.

4426. **The telegraph** guide; containing general information and directions for sending telegrams to all parts of England, Scotland, Ireland and the continents of Europe, Asia, Africa and America. 46 pp. 1 map. 12mo. *London, 1863*

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—See also 1639, 2897.

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—See also 4520, 5071, 5574.

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—See also 3279.

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—See also 4571.

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—See also 1911.

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—See also 2447.

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Prospectuses of Telegraph and Cable Companies

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4751. **Venn,** William W. Concession for the construction of a transatlantic telegraph line granted to Mr. Pier Alberto Balestrini. *London, 1869*

4752. **West India and Panama Telegraph Company.** Prospectus. 4 pp. 2 maps. Folio. *London, 1869*

4753. **British and American Telegraph Company.** Prospectus. 3 pp. Folio. *London, (186–)*

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4755. **Calcutta and Singapore Telegraph Company.** Prospectus. 3 pp. 1 map. L. folio. *London, 1870*

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4762. **Mediterranean (Extension) Telegraph Company** for connecting England with Malta and Corfu, viâ Sardinia. Prospectus. 3 pp. Folio. *London, (1870?)*

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4766. **Telegraph Construction and Maintenance Company** and the British Australian Telegraph Company. Articles of contract for laying cable between Singapore and Batavia. 7 pp. Folio. *1870*

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—See also 4766, 4826.

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Map of Europe showing telegraph lines.

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Text of the original Dutch concession with English translation.

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4802. **Nicholls,** Kerry, E. **Arnold** & J. A. **Grant.** Remarks on a proposed line of telegraph overland from Egypt to the Cape of Good Hope. 14 pp. 8vo. *London, 1876*

4803. **Orkney and Shetland Islands Telegraph Company.** Correspondence and papers. 1869–1876. 102 pp. 8vo. *London, (1876)*

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4805. **West Coast of America Telegraph Company.** Prospectus. 4 pp. Folio. *London, 1876*

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4806. **Minute** of a conference respecting the feasibility of a line of overland telegraph through Africa to connect the lines in South Africa with those of Egypt. (Proc. Roy. Geogr. Soc., Vol. 21, pp. 616–622.) 8vo. *London, 1877*

4807. **Sivewright,** (Sir) J(ames). A Trans-African telegraph. Précis of a paper read before the South African Philosophic Society on March 27, 1878. 11 pp. 8vo. *Cape Town, 1878*

Overland route: its importance, cost and maintenance.

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Showing cables constructed by the company.
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4823. **Schedule** of conditions for a submarine telegraph cable to be laid between Cadiz and Teneriffe, with branch lines to Gran Canaria-La Palma and Lanzarote. (Spanish and English.) 16 pp. 8vo. *1882*

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SECTION VI

Reports of Electric Light, Telephone and Manufacturing Companies

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Reports of Electric Light, Telephone and Manufacturing Companies

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Edwin Clark's system of train signals.
—See also 4391.

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—See also 4686.

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General explanations and instructions for the maintenance of electric bells.

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4834. **Companie du Chemin de Fer du Simplon.** Rapport annual du Conseil d'Administration, 28, Juin 1876. 28 pp.—Bouveret-Sierre. Compte d'exploitation. 1875. 3 pp.—Bilan général. 1875. 2 pp.—Sierre-Loèche-Viége. Décomposition par articles de la classification des dépenses générales de construction 1875. 2 pp.—Bouveret-Sierre. Décomposition par articles de la classification des travaux d'extension et de parachèvement. 1875. 3 pp. 8vo. *Lausanne, 1876*
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4837.——Prospectus. 5 pp. L. folio. & 4to. *London, 1878*
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SECTION VII

Patent Specifications—Litigation

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Patent Specifications—Litigation

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The author's chemical telegraph.
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Description of Brett's needle telegraph.

4999a.——Compendium of the improvements effected in electric telegraphs with a description of their patent electro-telegraphic converser, and the opinions of the public press on its merits. 64 pp. ill. 1 plate. 12mo. *London, 1847*

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The case was brought by the Electric Telegraph Company for supposed infringements of patents of Messrs. Wheatstone and Cooke by Messrs. Nott and Gamble. Pages of special interest: 61, 65, 66, 126.
—See also 2933, 4997.

5001. **Hatcher**, William Henry. Specifications for improvements in electric telegraphs and in apparatus connected therewith and also in electric clocks and time-keepers. (Patent Journal, 1847, pp. 452–455+474–476.) ill. 8vo. *London, 1847*

The electric dial telegraph.
—See also 2863.

5002. **Mapple**, Henry. Specifications of patents for improvements in apparatus for transmitting electricity between distant places,

and electric telegraphs. (Patent Journal and Inventor's Magazine, 1847, pp. 817–819.) ill. 8vo. *London, 1847*

Conductors, insulated and enclosed in leader tube.
—See also 5003, 5012.

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A form of the double-needle telegraph.
—See also 5012.

5004. **Poole,** Moses. Specifications of the patent for improvements in the construction and working of electric telegraphs and in apparatus connected therewith partly applicable to other purposes. (Repertory of Patent Inventions, Vol. XIII, pp. 1–15+89–105.) 1 plate. 8vo. *London, 1847*

Improvements in magneto-electric machines.

5005. **Bakewell,** Frederick Collier. Specification for improvements in making communications from one place to another by means of electricity. (Repertory of Patent Inventions, Vol. 14, pp. 65–76.) 1 plate. 8vo. *London, 1848*

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—See also 1249.

5006. **Barlow,** William Henry & Thomas **Forster.** Specifications for improvements in electric telegraphs and in apparatus connected therewith. (Repertory of Patent Inventions. Vol. 13, pp. 341–352.) 1 plate. 8vo. *London, 1848*

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Modifications in the magneto-electric apparatus used in telegraphs whereby two distinct currents can be derived from the same magnet.
—See also 4646.

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provements in electric telegraphs. (Repertory of Patent Inventions, Enl. Ser., Vol. 13, pp. 132–149+213–233.) 3 plates. 8vo. *London, 1849*

The inventors substitute horseshoe magnets instead of magnetic needles in electric telegraphs.

—See also 3062, 3666.

5010. **Ricardo,** John Lewis. Specification of the patent for improvements in electric telegraphs and in apparatus connected therewith. (Repertory of Patent Inventions, Vol. 14, pp. 1–4.) 1 plate. 8vo. *London, 1849*

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—See also 3380.

5011. **The electric light.**—Mr. Staite's new patent. (The Index, Vol. 1, pp. 65–66+71–72+81–82.) 8vo. *London, 1849*

Two papers on Staite's battery.

5012. **Clark,** Edwin (1814–1894) & Henry **Mapple.** Improvements in electric telegraphs and in apparatus connected therewith. Patent No. 13,336. 5 pp. ill. 8vo. (*London,*) *1850*

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5013a.——(The same paper.) 80 pp. 8vo. *Paris, 1867*

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5015.——Improvements in apparatus for conveying letters or parcels by the pressure of air and vacuum. Patent No. 212. 5 pp. ill. L.8vo. *London, 1854*

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The author's claims recorded. (See No. 5016.)
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The postmaster-general (W. Dennison) thought it unwise for the government to take over the proposed system of telegraphs as part of the postal service.

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5224.——Government and the telegraphs. Statement of the case of the Electric and International Telegraph Company against the Government bill for acquiring the telegraphs. 93 pp. 8vo. *London, 1868*

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—See also 5245.

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Lieut-Colonel Stewart was director-general of the Indo-European telegraphs.

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The author discusses matters that are common and others that are peculiar to telegraph companies and gives numerous illustrations from interesting cases.

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Paper by Captain Stotherd on the electric telegraph in military operations and another by Captain Vetch of the French Atlantic cable in which the subject is extensively treated from point of view of the electrical engineer.

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5259. **Meili,** Friedrich. Das Telegraphen-Recht. 200 pp. 8vo. *Zurich, 1871*

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The committee of the Board of Directors regarded the scheme as one to enrich its promoters at the expense of the private interests which it sought to supplant.
—See also 4435.

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—See also 5320.

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5274a.——Vis inertiae at the post-office. Present position of the question, Febr., 1876. Fourth edition. x+vi+39 pp.+Supplement, 15 pp. 8vo. *London, 1876*

—See also 3940.

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The proceedings were occasioned by the acquisition of telegraphs by the government.

—See also 5320.

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—See also 5320.

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—See also 4432, 4764.

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Complaint of neglect by the Government of the author's telegraph instrument.

—See also 3940.

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Proceedings in the liquidation of the Direct United States Cable Company.
—See also 4517.

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5313.——Account showing the gross amount received and expended in respect of telegraph service during 1870–1878. 3 pp. Folio. *London, 1879*

5314.——Account showing the gross amount received and expended on account of the telegraph service during the year ended 21st of March, 1878. 3 pp. Folio. *London, 1879*

5315.——Agreement dated May 9th, 1879, entered into by the Lords Commissioner of Her Majesty's Treasury with the Telegraph Construction and Maintenance and Eastern Telegraph Companies for establishing telegraphic communication with the South African colonies. 7 pp. Folio. *London, 1879*

5316.——Minutes or memoranda by the Secretary of State for India or by members of council in 1873, on the subject of telegraphic communications with the government of India. 6 pp. Folio. *London, 1879*

5317.——Report of the Treasury officers of accounts on the subject of certain representations made to the Treasury respecting the purchase by the Post-Office of the undertaking of the United Kingdom Electric Telegraph Company under the provisions of the telegraph act, 1868. 2 pp. Folio. *London, 1879*

5318. **Thompson,** John L. The inviolability of telegraphic dispatches; argument before the committee on privileges and

elections of the United States Senate for the Western Union Telegraph Company. 18 pp. 8vo. *Washington, 1879*

It is held that telegraph companies may not produce in courts of law the original copy of a dispatch.

5319. **Great Britain—Post Office Department.** Petition of Postmaster-General (John Manners against Liverpool lighting.) 3 pp. Folio. *London, 1879*

—See also 4458.

5320. **Great Britain—Postmaster General.** Report (26th) on the post-office. 60 pp. 8vo. *London, 1880*

Short report on the telegraph service.

—See also 5244, 5273, 5275, 5280, 5287.

5321. **Postal telegrams.**—Deputation to the Postmaster-General. (Journal Society of Arts, Vol. 28, pp. 735–739.) 4to. *London, 1880*

Reduction of the price of the inland telegram.

5322. **Gisborne,** Frederick N(ewton). (1821–1892.) Report on telegraph and signal service. With maps of each system 1881–1882, Ottawa, Canada. 20 pp. 8vo. *Ottawa, 1881*

—See also 3578.

5323. **Great Britain—Board of Trade.** Proceedings and business under the weights and measures act, 1878. 21 pp. 4to. *London, 1881*

Withworth gauges; the metric system.

—See also 5220.

5324. **Varley,** C(romwell) F(leetwood) (1828–1883) & W(illiam) E(dward) **Ayrton.** Joint report of Stearns vs. Submarine Telegraph Company between Great Britain and the Continent of Europe. 24 pp. 8vo. *London, 1881*

—See also 3372, 3858.

5325. **Bower,** George Spencer & Walter **Webb.** Law relating to electric lighting, being the electric lighting act, 1882, with commentary, also, a general introduction explaining its scope and probable working and an appendix consisting of the rules of the Board of Trade issued under the powers thereby granted. xx+259 pp. 8vo. *London, 1882*

5325a.——Second edition. xxiv+389 pp. 8vo. *London, 1889*

5326. **Fitzgerald,** J. V. Vesey. Electric lighting act, 1882, and the rules issued under the act, with short explanatory notes and cases and the several acts incorporating therewith. xxv+123 +viii pp. 8vo. *London, 1882*

Useful to consumers as well as suppliers of electricity.

5327. **Great Britain—Board of Trade.** Bill for the lighting of the Borough of Liverpool. (42 & 43 Vict.—Sess. 1878–1879.) 19 pp. Folio. *Liverpool, 1882*

5328.— —Electric lighting act, 1882. (45 & 46 Vict. Ch. 56.) ii+21 pp. Folio. *London, 1882*

5328a.— —Electric lighting act, 1882. Rules made by the Board of Trade with respect to applications for licenses and provisional orders, etc. 4 pp. Folio. *London, 1882*

5328b.— —Digest of the law on electric lighting. Vestry of Paddington. With appendix containing list of offences and penalties, a copy of the electric lighting acts, 1882 and 1888, and rules made by the Board of Trade. 71 pp. 8vo. *London, 1888*

Note on Lord Thurlow's amendment to the electric lighting act, 1882.

5328c.— —Electric lighting act, 1882. Committee formed on the suggestion of President of the Board of Trade, to frame clauses in amendment of the electric lighting act, 1882, and to confer with the Board of Trade as to the terms of the provisional orders and licenses. 12+1+ii+10 pp. Folio. *London, 1885*

Text and amendments; also list of members.

5328d.— —Electric lighting act, 1882. Report of executive committee and list of members. 12 pp. Folio. *London, 1885*

5328e.— —Electric lighting act, 1882. Amendment. (H. L.) A bill (as amended in committee) instituted an act to amend the electric lighting act, 1882. 4 pp. Folio. *London, 1887*

5329.— —Copy of correspondence between the Board of Trade and Telegraph Cable Companies on the subject of protecting from injury submarine cables and vessels engaged in laying and repairing submarine cables. 39 pp. Folio. *London, 1882*

—See also 5220.

5330. **Parliamentary Paper.** Report for the select committee on electric lighting bill, together with the proceedings of the committee and minutes of evidence. xviii+310 pp. Folio. *London, 1882*

Evidence of Sir Frederick Bramwell, Spottiswoode, Hopkinson, Siemens, Crompton and others.

5331. **Blakesley,** Thomas Holmes. Electricity at the Board of Trade. 24 pp. 8vo. *London, 1883*

Remarks on the electric lighting bill, 1882.
—See also 2379.

5332. **Cunynghame,** Henry. Treatise on the law of electric lighting with the acts of Parliament, and rules and orders of the Board of Trade, a model provisional order, and a set of forms; to which is added a description of the principal apparatus used in electric lighting, with illustrations. viii+295 pp. ill. L.8vo. *London, 1883*

Besides the official acts and explanatory notes, there are chapters on dynamos, lamps, motors, conductors and storage batteries.

5333. **Frost,** A(lfred) J. Catalogue of works on earth currents. (From Report to the Lords of the committee of Council on Education by the committee of advice, with respect to the International Congress for the determination of electrical units to be held at Paris in October, 1883.) 8 pp. 12mo. *London, 1883*

—See also 5768.

5334. **Great Britain—Board of Trade.** Bill respecting the establishment of a submarine telegraph cable between the Islands of Teneriffe and Saint Louis, Senegal. 25 pp. 8vo. *Paris, 1883*

The bill is in French and in English.

—See also 5220.

5335. **Great Britain—Post Office Department.** Copy of Treasury minutes with regard to the reduction of the minimum charge for post office telegrams. 1 p. Folio. *London, 1883*

—See also 4458.

5336. **Higgins,** Clement & E. W. W. **Edwards.** Electric lighting act, 1882, the acts incorporated therewith, the Board of Trade rules, together with numerous notes and cases. xii+152 pp. 4to. *London, 1883*

5337. **London—Board of Trade.** New legal standard wire-gauge. 3 pp. 8vo. *London, 1883*

5338. ——Electric lighting provisional orders (No. V) Bill (St. James and St. Martin's (London) Order.) Petition of the Telegraph Construction and Maintenance Company. Against.—By counsel. 4 pp. Folio. *London, 1883*

5339. ——Electric lighting provisional orders (No. V) Bill (St. James and St. Martin's (London) Order. Petition of the inhabitants, etc., of the Parish of St. James, Westminster. Against. —By counsel. 8 pp. Folio. *London, 1883*

5340. ——Report from the select committee on electric lighting, provisional order bills; together with the proceedings of the committee, minutes of evidence and appendix. 147 pp. Folio. *London, 1883*

—See also 5346.

5341. **Parliamentary Paper.** Copy of correspondence on the subjects of a proposed investigation into the respective merits of gas, oil and electricity as lighthouse illuminants, including correspondence between the Board of Trade and Professor Tyndall. 62 pp. Folio. *London, 1883*

5342. ——Copy of further correspondence of the subject of the composition of the lighthouse illuminants committee (in continuation of Parliamentary Paper No. 168). 15 pp. Folio. *London, 1883*

5343.— —Draft report: committee on the electric lighting act of 1882. 7 pp. Folio. (*London, 1883*)

5344. **Great Britain—Post-Office Department.** Post-Office and the Telephone companies. 48 pp. 4to. *London, 1884*
Appeal against the post-office for telephonic facilities, (1884).
—See also 4458.

5345. **Haywood,** William. Reports to the Streets Committee of the Commissioners of Sewers of London as to the Commission undertaking to supply electricity in a district of the city, and upon various proposals by companies and others for lighting by electricity. 24 pp. 8vo. *London, 1884*
(Autograph copy.)
—See also 4840.

5346. **London—Board of Trade.** (MS. minutes of a meeting of the general committee appointed to frame amendment to the electric lighting act of 1882.) 1 p. Folio. *London, 1885*
—See also 5337.

5347. **Great Britain—Board of Trade.** Report of the electric lighting committee as to the action to be taken by the Vestry in the matter of supplying electricity for the lighting purposes in Paddington. 47 pp. 8vo. *Paddington, 1889*
Advantages of electric incandescent lighting, p. 24.
—See also 5220.

SECTION IX

Expositions—Congresses—Societies—Banquets, etc.

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Expositions—Congresses—Societies—Banquets, etc.

5348. **London Electrical Society.** Report of the committee appointed to test the action of an instrument invented by Lieutenant R. J. Morrison, and denominated by him a portable magnetic electrometer. 8 pp. 3 plates. 8vo. *London, 1838*

5349. **Clark,** (Josiah) Latimer. (1822–1898.) Announcement of a lecture on the electric telegraph given at Great Marlow, Jan., 1854. 1 p. 4to. *Marlow, 1854*

—See also 2897.

5350. **Der Deutsch-Oesterreichische Telegraphenverein.** (Didaskalia, August 8, 1854.) 4to. *Frankfurt, 1854*

A statistical note of the Austro-German Telegraph-Union.

5351. **Society for the Encouragement of Arts, Manufacture, and Commerce, etc.** Catalogue of the 10th exhibition of inventions, 1858. 56 pp. ill. L.8vo. *London, 1858*

5352. **Dodwell,** R(obert). Circular on proposed exhibition of telegraph apparatus. 1 p. 4to. *Manchester, 1861*

—See also 1514, 4467.

5353. **Varley,** C(romwell) F(leetwood). (1822–1883.) The telegraph service at the Free Trade Hall, Manchester. (Technologist, Vol. 2, pp. 81–86.) 8vo. *London, 1861*

—See also 3372.

5354. **Catalogue** of apparatus etc., in telegraphic exhibition. 8 pp. 8vo. (*London, 1861?*)

5355. **British and Irish Magnetic Telegraph Company.** Inventions exhibited at the International Exhibition, 1862. 1 p. Folio. *London, 1862*

Telegraph-instruments exhibited.

—See also 4571.

5356. **Jenkin,** (Henry Charles) Fleeming. (1833–1885.) Report on the electrical instruments at the International Exhibition, 1862. (Juror's reports of International Exhibition, Class xiii, 44–98.) 4to. *London, 1863*

—See also 3137.

5357. **Atlantic Telegraph Company.** Report of the proceedings at the inauguration banquet given by Mr. Cyrus W(est) Field of New York on Friday the 15th of April, 1864. 32 pp. 8vo. *London, 1864*

Speeches of Messrs. Cyrus W. Field, Latimer Clark, Cromwell F. Varley, John Pender.

—See also 4543.

5358. **Field,** Cyrus W(est). (1819–1892.) Report of the proceedings at an inauguration banquet to commemorate the renewal by the Atlantic Telegraph Company of cable laying from Ireland to Newfoundland. 32 pp. L.8vo. *London, 1864*

—See also 3021.

5359. **International Telegraph Convention of Paris.** (April 18th, 1865.) 23+7 pp.+Annexes, 3 pp. table+22 pp. Supplement. Folio. *Paris, 1865*

5360. **International Telegraph Convention** (June 30th, 1858). (Called the Brussels Convention.) 24 pp. Folio. *Bombay, 1865*

5361. **Institution of Civil Engineers, London.** Catalogue of the library. Second edition. viii+412 pp. 8vo. *London, 1866*

The appendix contains the catalogue of the Horological Library bequeathed to the Institution.

—See also 5469, 5499.

5362. **New York Chamber of Commerce.** Report of the proceedings at the banquet given to Cyrus W(est) Field at the Metropolitan Hotel, Nov. 15th, 1866. 94 pp. 8vo. *New York, 1866*

Brief history of the Atlantic cable: difficulties, delays, success.

5363. **Du Moncel,** Th(eodose Achille Louis). (1821–1884.) La télégraphie à l'exposition universelle de 1867. (Etudes sur l'exposition de 1867, pp. 364–388.) ill. plate. L.8vo. *Paris, 1867*

Notice of the various telegraph systems exhibited, including that of Hughes and Abbe Caselli.

—See also 3343.

5364. **Hooper,** W(illiam). Description of Mr. Hooper's patent insulated wires and cables, exhibited in the Paris exhibition. 1 l. 4to. *London, (1867?)*

—See also 3546.

5365. **Tefft.** Remarks at the dinner given by the Americans in Paris, August the 17th, at the Trois Frères, to S. F. B. Morse, in honor of his invention of the telegraph and on the occasion of its completion under the Atlantic Ocean. 7 pp. 8vo. *Paris, (1867?)*

5366. **Hjorth,** Soren. Batterie magnéto-électrique. 28 pp. 1 plate. 4to. (Exposition Universelle, Paris, 1867.) *Paris, 1868*

Short description with diagrams of Hjorth's magneto-electric machine, exhibited at Paris, 1867.

5367. **International Telegraph Convention of Paris,** 1865, revised at Vienna, 1868. 29 pp.+18 pp. Terminal rates+31 pp. Vienna conference. Folio. *London, 1868*

5368. **Conférence Télégraphique Internationale, Vienna, 1868.** Documents. 459 pp. Folio. *Vienna, 1868*

General statements relating to the transmission of telegrams, tariffs, etc.

5369. **Paris, Exposition Universelle, 1867.** Catalogue of the British section containing a list of the exhibition of the United Kingdom and its colonies and the objects which they exhibit with statistical introductions and an appendix. v pp. ill. 8vo. *London, 1868*

5370.— —British Commission. Reports. Presented by command. Vols. I to IV. 8vo. *London, 1868*

Reports referring to telegraph apparatus, photography, mining and metallurgy.

5371. **Banquet** to Cyrus W(est) Field, to be held at Willis's rooms, 1st July, 1868. 2 l. 4to. *London, 1868*

The committee on invitation to the banquet.

5371a. **Proceedings** at the banquet held in honour of Cyrus W(est) Field, of New York, in Willis's rooms, London, on Wednesday, July 1st, 1868. 80 pp. 12mo. *London, 1868*

Speeches delivered and cablegrams sent during the banquet.

5372. **Paris, Exposition Universelle, 1867.** La télégraphie à l'Exposition Universelle de 1867. 268 pp. ill. L.8vo. *Paris, 1869*

Apparatus of Hughes, Caselli, Bonelli; the Atlantic cable; pneumatic transmission.

5373. **Landing** of the French Atlantic cable at Duxbury, Mass., July, 1869. 57 pp. 6 plates. 8vo. *Boston, 1869*

Ceremonies on the occasion with photographs of the beach.

5374. **Society of Telegraph Engineers, London.** Rules and regulations. 15 pp. 8vo. *London, 1871*

5374a.— —(The same.) vi+13 pp. 8vo. *London, 1871*

5374b.— —List of officers and members and rules and regulations. 18 pp. 8vo. *London, 1872*

5374c.— —Rules and regulations. 15 pp. 8vo. *Westminster, 1874*

5374d.— —List of members and rules and regulations. 28 pp. 8vo. *Westminster, 1874*

—See also 4909.

5375. **Horsford,** E(ben) N(orton). (1818–1893.) Address at the Morse memorial meeting in Faneuil Hall, April 16th, 1872. 95 pp. 8vo. *Boston, 1872*

Succinct account of telegraphic discovery and invention.

5376. **International Telegraph Convention,** revised at Rome, 1872. Translated by Alfred Brasher. 27+29 pp. Special rates, 36 pp. Rome Conference. Folio. *Rome, 1872*

5377.——Documents de la Conférence Télégraphique Internationale de Rome publiées par le Bureau International des Administrations Télégraphiques. 688+vi pp. 4to. *Berne, 1872*

Classification and transmission of telegrams as well as special taxes relating thereto.

5377a.——Memorandum on proposed alterations in the International Telegraph Convention at Rome, by Bateman-Champain. With appendix by A. Brasher, containing a plan of a fixed tariff per word for telegraphic correspondence between India and Europe and from India to America. 15 pp. Folio. *1874*

5378. **Siemens,** (Sir) Charles William. (1822–1883.) Inaugural address delivered to the members of the Society of Telegraph Engineers. 19 pp. 8vo. *London, 1872*

Subjects suggested for papers to be read before the Society.
—See also 3107.

5379. **Society of Telegraph Engineers,** London. Annual reports. 1872, 1873, 1874. 8vo. *London, 1872–1874*

List of papers read.
—See also 4909.

5380. **Report** of the submarine companies upon the result of their attendance at the Telegraphic Conference, Rome, Dec., 1871, and Jan., 1872. 79 pp. 8vo. *London, 1872*

Advantages of belonging to the convention.

5381. **Globe Telegraph Company.** Report of the proceedings at the anniversary banquet given by Cyrus W(est) Field, of New York, at Buckingham Palace Hotel, London, on Monday, the 10th of March, 1873, in commemoration of the signature of the agreement on the 10th of March, 1854, for the establishment of a telegraph across the Atlantic. 22 pp. 4to. *London, 1873*

Speeches; list of guests.
—See also 4634.

5382. **Meteorological Society** (of Great Britain). List of fellows. 11 pp. 8vo. *London, 1873*

5383. **Ditcheiner,** Leander. Die Telegraphen-Apparate. (Officieller Austellungs-Bericht herausgegeben durch die General-Direction der Weltaustellung, 1873.) 56 pp. 6 plates. 8vo. *Vienna, 1874*

Telegraph apparatus at the Vienna exposition, 1873.

5384. **Neumayer,** G(eorg) B(althasar). Report on weather telegraphy and storm warnings, presented to the Meteorological Congress at Vienna by a committee appointed at the Leipzig Conference. 60 pp. 8vo. *London, 1874*

The chief question discussed was: "Does the interchange of Weather Tele-

grams appear so useful that it should receive a fuller development and firmer organization?"
—See also 3554.

5385. **Society of Telegraph Engineers, London.** Conversazione given by Sir William Thomson at King's College, Strand, Dec. 2nd, 1874. 6 pp. 8vo. *London, 1874*
List of exhibits.
—See also 4909.

5386. Thomson, (Sir) William (Lord Kelvin). (1824–1907.) Inaugural address to the Society of Telegraph Engineers, London. 24 pp. 8vo. *London, 1874*
The earth as a great magnet; atmospheric electricity.
—See also 2946.

5387. Brooks, David. (1820–1891.) Report on telegraphs and apparatus. (Vienna International Exposition, 1873.) 44 pp. 8vo. *Washington, 1874*
List of historical telegraph apparatus exhibited with dates.
—See also 1821, 5098, 5647.

5388. Clark, (Josiah) Latimer. (1822–1898.) Address as president of the Society of Electrical Engineers, London, on the respective merits and durability of gutta-percha and India-rubber joints. (Journ. Soc. Telegr. Engin., Vol. 4, pp. 319–334.) 8vo. *London, 1875*

5389.— —Inaugural address as president of the Society of Telegraph Engineers, London, on the origin and development of the electric telegraph. 23 pp. 8vo. *London, 1875*
Historical and statistical; the Ronalds's library transferred in trust of the Society of Telegraph Engineers; Glanvill's disproval (1665) of telegraphic communication; C. M. (Charles Marshall) and the Scots Magazine, 1753 (see No. 378); Sir Francis Ronalds's telegraph, 1816 (see No. 729).

5390.— —Catalogue of exhibits at the conversazione given by Latimer Clark, President of the Society of Telegraph Engineers. 12 pp. 4to. *London, 1875*
The exhibit contained some old and very rare books on magnetism and electricity from Latimer Clark's collection, now included in the Wheeler gift.
—See also 2897.

5391. **International Telegraph Convention.** Concluded at St. Petersburg, 1875. 7+70 pp. 1 table. Folio. *London, 1875*

5392.— —Convention Télégraphique Internationale conclue le (10) 22 juillet 1875 à St. Petersbourg. 38 pp. Folio. *1875*
Rules regulating international telegraphic service.

5393.— —Documents de la Conférence Télégraphique Internationale de St. Petersbourg publiés par le Bureau International des Administrations Télégraphiques. 677 pp. 4to. *Berne, 1876*
The conference treated such matters as the classification of telegrams, the use of a private code, tariff for international messages, etc.

5394. **Society of Telegraph Engineers, London.** Conversazione given by (Josiah) Latimer Clark at Willis's Rooms, King St., St. James's, Dec. 21st, 1875. 12 pp. 4to. *London, 1875*

List of exhibits.

—See also 4909.

5395. **Lines,** Robert B. Report on telegraphs and on telegraphic administration. (Vienna International Exhibition, 1873.) 88 pp. ill. 8vo. *Washington, 1876*

Historical collection exhibited by the German Government.

5396. **Philadelphia, International Exhibition, 1876.** Official catalogue of the British section. Part I. ill. map. pl. 4to. *London, 1876*

Extensive account of the natural resources of Queensland.

5397. **Society of Telegraph Engineers, London.** Conversazione given by the president and council at Willis's Rooms on Monday, Dec. 18th, 1876. 4 l. 8vo. *London, 1876*

Catalogue of exhibits.

—See also 4909.

5398. **Thomson,** (Sir) William (Lord Kelvin). (1824–1907.) Address to the mathematical and physical section of the British Association, Glasgow, Sept. 7th, 1876. (Engineering, Vol. 22, pp. 235–236, 241–243, 256, 265.) Folio. *London, 1876*

Impressions of the Philadelphia centennial exhibition, 1876.

—See also 2946.

5399. **Ayrton,** W(illiam) E(dward). Preliminary catalogue of the apparatus in the Telegraph Museum. 20 pp. 8vo. *Tokyo, 1877*

—See also 3858.

5400. **Philosophical Society, Glasgow.** Petition to the House of Commons against a bill for consolidating with amendments the act relating to letter patent for inventions. 10 pp. 8vo. *Glasgow, 1877*

The petition bears the signature of William Thomson.

5401. **Siemens,** (Sir) Charles (William). (1822–1883.) Inaugural address delivered at annual general-meeting of Iron and Steel Institute, March, 1877. 30 pp. 8vo. *Newcastle-upon-Tyne, 1877*

"Let technical schools confine themselves to teaching those natural sciences which bear upon practice, but let practice be taught in the workshop and in metallurgical establishment," p. 4.

—See also 3107.

5402. **Society of Telegraph Engineers, London.** Circular relating to the Gauss centenary. (English and German text.) 5 pp. 4to. *London, 1877*

"Aided by his younger friend, Wilhelm Weber, he (Gauss) erected the first electric telegraph."

—See also 4909.

5403. **Thomson,** (Sir) (William) (Lord Kelvin). (1824–1907.) Reports on the Philadelphia National Exhibition of 1876. Vol. I. Report on "electric and telegraphic apparatus" at the centennial exhibition. pp. 271–272. 8vo. *London, 1877*

—See also 2946.

5404. **Wray,** Cecil & Leonard **Wray, Jr.** Instruments exhibited at the soirée of the Royal Society, April 25th, 1877. 3 pp. 8vo. *London, 1877*

Circular on telephones.

5405. **American Electrical Society.** Constitution and by-laws and list of officers and members. 16 pp. 24mo. *Chicago, 1878*

5406. **International Meteorological Congress, Vienna.** Reports to the permanent committee of the first international meteorological congress at Vienna on atmospheric electricity, maritime meteorology, weather telegraphy. 97 pp. 1 plate, ill. 8vo. *London, 1878*

The report on atmospheric electricity is by Prof. J. D. Everett.

5407. **Clark,** (Josiah) Latimer. (1822–1898.) Letter to the President and Council of the Society of Telegraph Engineers. 2 pp. 4to. *London, 1879*

Need of forming a society of electricians.

—See also 2897.

5408. **Field,** Cyrus W(est). (1819–1892.) Invitation to Latimer Clark. *New York, 1879*

This card is interesting artistically and telegraphically.

—See also 3021.

5409. **International Telegraph Convention, 1879.** Signatures of delegates. 6 pp. Folio. *London, 1879*

5410.——International Telegraph Convention with London revision of service regulations and tariffs, 1879. Translated by Alfred Brasher. 95 pp. Folio. *London, 1879*

Official report.

5410a.——Weekly diary. June 5th–July 12th, 1879. 5 printed cards. *London, 1879*

5410b.——Documents de la Conférence Télégraphique Internationale de Londres publiés par le Bureau International des Administrations Télégraphiques. vii+667 pp. 4to. *Berne, 1880*

Regulations referring to international telegram-tariff.

5411. **Society of Telegraph Engineers, London.**—Report of the committee on the Birmingham Wire Gauge; together with papers on the unit of the Birmingham wire gauge, by C(harles) V(incent) Walker; and on the Birmingham wire gauge, by (Josiah) Latimer Clark. 31+39 pp. 8vo. *London, 1879*

Among the members of the committee were: Prof. Abel, Latimer Clark, W H. Preece, C. W. Siemens, Willoughby Smith and C. V. Walker.

5412.— —Conversazione upon the occasion of the presence in London of the delegates to the International Telegraph Conference. 11 pp. 4to. *London, 1879*

List of exhibits with names of exhibitors.
—See also 4909.

5413. **Ocean** telegraphy. 64 pp. 8vo. *New York, 1879*

Memorial of the 25th anniversary of the organization of the first company formed to lay an Ocean cable, with addresses delivered on the occasion.

5414. **Varley Electric and Scientific Works.** Exhibits at the Royal Aquarium. (Varley Patent Flexible Candle.—Patent Accumulator.—Varley-Shearer Patent Electric Meter.) 1 p. Folio. *London, (187–)*

5415. **Preliminary** report of the committee W. E. Ayrton, O. J. Lodge, J. E. H. Gordon and J. Perry, appointed for the purpose of accurately measuring the specific inductive capacity of a good Sprengel Vacuum, and the specific resistance of gases at different pressures. (British Association for Adv. of Sc., 1800, pp. 197–201.) 8vo. *London, 1880*

Specific inductive capacity of several gases.

5416. **Clark,** (Josiah) Latimer. (1822–1898). Letter to Mr. Edward Graves on the proposal to change the name of the Society of Telegraph Engineers. 14 pp. Folio. (Dated London, Febr. 20, 1880.) *London, 1880*

—See also 2897.

5417. **Preece,** (Sir) W(illiam) Henry. Inaugural address. 25 pp. 8vo. *London, 1880*

The author discusses the question "Is electricity a form of matter, or is it a form of force?"
—See also 3556.

5418. **Society of Telegraph Engineers, London.** Circular upon altering the name of the Society. 1 p. 8vo. *London, 1880*

It was recommended that the Society be called "The Society of Telegraph Engineers and Electricians."

5419.— —Draft charter to the Society of Telegraph Engineers and Electricians. 4 pp. Folio. *London, 1880*

The names of Graves, Siemens and Latimer Clark appear in the text of the charter.

5420.— —List of rare and curious books relating to electricity, magnetism, navigation, etc., exhibited upon the occasion of the opening of the Ronald's Library. 4 pp. 4to. *London, 1880*

Some of the rarer books in both collections (Ronald's and Latimer Clark's.)
—See also 4909.

5421. **British Association for the Advancement of Science.** Resolutions appointing a committee to determine the gauge for the manufacture of small screws. 1 p. 4to. *London, 1881*

5422. **Chambre Syndicale de l'Electricité.** Reunion internationale des éléctriciens. 3 pp. 4to. *Paris, 1881*

Letter of convocation to electrical congress (1881) signed by H. Fontaine.

5423. **Collin.** Notes sur l'unification de l'heure dans Paris et dans toute la France.—Nomenclature et description des appareils exposés. (Exposition Internationale d'Electricité.) 39 pp. 8vo. *Paris, 1881*

System for the electric transmission of time.

5423bis. **Delaurier.**—Notice analytique des inventions de M. Delaurier à l'Exposition Internationale d'Electricité. 20+7 pp. 8vo. *Paris, 1881*

Short notice of electric inventions; note on the author's battery.

5424.—**Gerard,** Antoine, J. Note sur les objets exposés. (Exposition Internationale d'Electricité, Paris, 1881.) 28 pp. 3 plates. L.8vo. *Paris, 1881*

Electric lighting apparatus exhibited by the inventor at the Paris Exposition, 1881.

—See also 1643.

5425. **Hazen,** W(illiam) B(abcock). (1830–1887.) History of the signal service army of the United States and special catalogue of the United States Signal Service Exhibit at the International Exhibition of Electricity. 43 pp. 8vo. *Paris, 1881*

The modes of signaling most frequently employed are by flags, torches, heliostats, telegraphs and telephones.

5426. **International Electrical Congress, Paris, 1881.** Réunion Internationale des Électriciens. 3 pp. 4to. *Paris, 1881*

Order of meetings, subjects, etc.

5427.— —Various papers.—Décret, programme, séances générales, première section, deuxième section, troisième section, commission électro-physiology, commission des lignes télégraphiques, commission des units électriques. 4to. *Paris, 1881*

Minutes of various meetings. Among American representatives were Prof. Rowland of Johns Hopkins University, and Prof. Barker of the University of Pennsylvania.

5429.— —Décret; liste des membres du congress. 1–4–séance. Liste des adhérents. Lettres. v. pp. 4to. *Paris, 1881*

This committee discussed the question of the practical electrical units.

5430.— —Catalogue général officiel. 227 pp. ill. pl. 8vo. *Paris, 1881*

List of exhibitors of electric generators with notes on some of the more important collections.

5431.— —Catalogue spécial des objets exposés dans la section du service des signaux. 7 pp. 8vo. *Paris, 1881*

Registering instruments for use with barometers, anemometers, pluviometers.

5432.— —Guide.—Plan par groupes-numéros-salles. 46 pp. 8vo. *Paris, 1881*

Classified list of electrical exhibitors.

5433.——Inventaire des objects envoyés par le département impérial des télégraphes de Russie. 16 pp. L.8vo. *Paris, 1881*

List of instruments exhibited at Paris, 1881, with short description of each.

5434.——L'électricité et ses applications exposé sommaire et notices sur les différents classes de l'exposition. 174 pp. ill. L.8vo. *Paris, 1881*

Papers on the history of electricity and magnetism; static electricity; the electrometer; primary batteries.

5435.——La séction Suédoise, déscription spéciale par C. A. Nystroem. 133 pp. 12mo. *Paris, 1881*

Account of the Swedish telegraph exhibit at the Paris exhibition, 1881.
—See also 1551.

5436.——Note pour MM. les members du jury. 16 pp. 4to. *Paris, 1881*

Pamphlet directing the attention of the jury to the exhibit of the Society.

5437.——Notices sur les objets exposés par les divers services de la ville de Paris. 65 pp. 4to. *Paris, 1881*

Notice on the construction of lightning rods; telegraph apparatus (city of Paris), at the exposition of 1881.

5438.——Rapport of the jury international des récompenses. Groupe IV. 4 pp. Folio. *Paris, 1881*

Remarks of the jury on the group of electrical exhibits, including a Holtz machine, certain galvanometers, and electrometers.

5439.——Règlement général. 3 pp. 4to. *Paris, 1881*

5440.——Section Belge. Catalogue officiel. 55 pp. 1 plan. 12mo. *Brussels, 1881*

Official catalogue.

5441.——(Two photographs of the Exposition 10x8½ cm.) (*Paris, 1881*)

5442.——Catalogue officiel (Section Belge). lxv+55 pp. pl. 12mo. *Brussels, 1881*

Brief notice of the electrical industry in Belgium.

5443.——Society of Telegraph Engineers and of Electricians.—Guide book to the British section at the Paris electrical exhibition. 80 pp. 8vo. (Special No. of the Journal of the Society.) *London, 1881*

5444.——Special-Katalog fuer Deutschland. 60 pp. 12mo. *Berlin, 1881*

List of electric apparatus exhibited by Germany at the Paris Exposition, 1881.

5445. Munro, J(ohn). The jubilee of electricity. Paris, 1881. 12 pp. 12mo. *Paris, 1881*

Thoughts suggested by the Paris International Exhibition of electricity.
—See also 3696.

5446. **Society of Telegraph Engineers and of Electricians.** Conversazione on the occasion of Helmholtz's visit to London. 4 pp. 4to. *London, 1881*

—See also 4909.

5447. **Zetzsche,** (Karl) Ed(uard). (1830–1894.) Geschichtliche Telegraphenapparate in der Ausstellung fuer Elektricitaet zu Paris, 1881. (Elektrotechnische Zeitschrift, Vol. 2, pp. 354–362+492–503.) 4to. *Berlin, 1881*

Notes on the historical telegraph apparatus at the Paris exposition, 1881. (Autograph copy.)
—See also 3899.

5448. **Electrotechnical Society.** Origin and operation of the Electro-Technical Society. 30 pp. 12mo. *Berlin, 1881*

Society founded in 1879 for the promotion of the technical application of electricity.

5449. **Projet** de programme pour les séances du Congrès International d'Electricité, 1 Aout, 1881. 8 pp. 4to. *Paris, 1881*

5450. **Beetz,** W(ilhelm) von, O. von **Mueller** & E. **Pfeiffer.** Officieller Bericht ueber die im Kgl. Glaspalaste zu Muenchen, 1882, stattgehabte Internationale Elektricitaets-Ausstellung, verbunden mit elektrotechnischen Versuchen. 2 vols. 244+154 +vi pp. ill. 4to. *Munich, 1882*

Official report on the Munich Exposition of 1882.
—See also 3491.

5451. **Boulard,** J. Production et applications de l'électricité. (Revue de l'Exposition Internationale d'Electricité.) 156 pp. ill. L.8vo. *Paris, 1882*

General description of well-known dynamos together with elementary theory.
—See also 2264.

5452. **Conférence Internationale pour la Détermination des Unites Electriques.** 16 Oct.–26 Oct., 1882. Procès-verbaux. 161 pp. Folio.—Deuxième session. 117 pp. Folio. *Paris, 1882–1884*

Minutes of the various meetings. Among those who attended were Sir William Thomson, Prof. Fleeming Jenkin, Prof. D. E. Hughes.

5453.— —(Additional matter.) 8 pp. Folio. *Paris, 1882*

Subject to be considered at meeting of International Conference on electrical units, Paris, 1882.

5454. **Congrès International des Electriciens, 1881.** Comptes rendus des travaux. 400 pp. ill. L.8vo. *Paris, 1882*

Papers by Marcel Deprez, Froelich; discussion on lighting conductors.

5455. **"Cosmopolite."—Electrical exhibition.** By a Cosmopolite. (Modern Thought, 1882, pp. 168–171.) L.8vo. *London, 1882*

The London Crystal Palace exhibition, 1882.

5456. **Edison Electric Light System.** Crystal Palace International Electric Exhibition. (Advertisement.) *London, 1882*

5457. **Glen,** W. Cunningham & Alexander **Glen.** Electric lighting act, 1882, and the acts therewith incorporated, also the rules of the Board of Trade, of October, 1882. xi+247 pp. 12mo. *London, 1882*

The powers and obligations of companies supplying electric energy defined.

5458. **International Electric and Gas Exhibition, London, 1882–1883.** General circular. 2 pp. 4to. *London, 1882*
—See also 5470.

5459. **International Electric Exhibition, 1881–1882.** Official catalogue, edited by W. Grist, with specially prepared plans, showing the position of each exhibitor and indicating the spaces lighted by various systems. 108 pp. pl. 8vo. *London, 1882*

5460.— —Award of prizes. (Globe, August 2nd, 1882.) Folio. *London, 1882*
Contains well-known names in the early period of electric lighting.

5461. **Kareis,** J(oseph). Das Schulwesen fuer Elektrotechnik auf der Elektricitaetsausstellung in Paris. (Elektrotechnische Zeitschrift, Vol. 3, pp. 21–25+108–113.) 9 pp. L.8vo. *Berlin, 1882*
Electrical instruction in technical schools.

5462. **Lightning Rod Conference, 1882.** Report of the delegates from the Meteorological Society, Royal Institute of British Architects, Society of Telegraph Engineers and of Electricians and the Physical Society; with a code of rules for the erection of lightning conductors and various appendices. Edited by G. J. Symons. x+19+261 pp. 8vo. *London, 1882*
Numerous appendices contain collected information on lightning, lightning accidents, works on lightning conductors and kindred subjects.

5463. **Réunion Internationale des Electriciens.** 334 pp. ill. 8vo. *Paris, 1882*
Discussions on electricity and work; electric transmission and distribution of energy, electro-metallurgy; construction of cables, etc.

5464. **Preece,** (Sir) W(illiam) H(enry). Electrical exhibitions. (Journ. Soc. Arts, Vol. 31, pp. 80–81.) L.8vo. *London, 1882*
Peculiar features of exhibitions.
—See also 3556.

5465. **Society of Telegraph Engineers and of Electricians.** The President's reception at Chatham, July 11th, 1882. 1 p. 4to. *Chatham, 1882*
—See also 4909.

5466. **Webb,** F(rederick) C(harles). (1828–1899.) A submarine telegraphic entertainment. 4 pp. 8vo. *London, 1882*

5466a.— —Explanation concerning "The submarine telegraphic entertainment." 2 pp. 4to. *London, 1882*
A humorous production.
—See also 3111.

5467. **Allard,** E. and others. Experiences faites à l'exposition d'électricité. 152 pp. 8vo. *Paris, 1883*
Remarks on the electrical measurements made on dynamos and arc lamps at the Paris Exposition of 1881 by Joubert, Potier, Tresca and others.
—See also 2220.

5468. **Eastern and Eastern Extension Telegraph Companies.** Invitation to meet D. Norvin Green. August 3, 1883. 1 card. *London, 1883*

5469. **Institution of Civil Engineers, London.** List of lectures. 1 p. 4to. *Westminster, 1883*
—See also 5361.

5470. **International Electric and Gas Exhibition, 1882–1883.** Official catalogue and handbook, edited by W. Grist. 163 pp. 2 plans. 8vo. (*London, 1883*)
Historical sketch of the gas industry; also electricity, its appliances and applications.

5471.— —Special report on electric lighting. pp. 181–241. 1 plan and table. 8vo. *London, 1883*
Different systems of arc and incandescent lighting with tabulated results.
—See also 5458.

5472. **International Electrical Congress, Paris, 1881.** Administration; jury rapports. 2 vols. 8vo. *Paris, 1883*
General information on electric generators, lamps, etc., Pacinotti, p. 80. Reports by Violle, Potier and Blavier.

5473. **International Fisheries Exhibition.** Illustrated description of the electric light machinery in the exhibition, with elementary notes on the production of electric currents. 31 pp. ill. 8vo. *London, 1883*
Steam engines with indicator diagrams, dynamos, lamps, etc.

5474. **Mourlon,** Charles (A. M.). L'électricité. A l'exposition internationale et coloniele d'Amsterdam de 1883 44 pp. 8vo. *Brussels, 1883*
Telephones, electric traction and electric lighting, etc., at the Amsterdam Exposition, 1883.
—See also 5493, 5771.

5475. **Société Internationale des Electriciens.** (Circular on the utility of forming an International Society of Electriciens.) 2 pp. 8vo. *Paris, 1883*

5476.— —List générale des members. 24 pp. 12mo. *Paris, 1883*

5477. **Society of Telegraph Engineers and of Electricians.** Inaugural address by Willoughby Smith, President. 29 pp. 2 plates. 8vo. *London, 1883*
Specific inductive capacity, earth currents, protection of property against lightning, glow lamps, etc.

5478.— —Memorandum and articles of Association. 20 pp. Folio. *London, 1883*
Among the signers were: Latimer Clark, W. Grylls Adams, Hughes, Preece, Willoughby Smith and Spagnoletti.
—See also 4909.

5479. **Valette,** H. Société des Electriciens. (Cosmos-les Mondes, Ser. III, Vol. 5, pp. 321–324.) 8vo. *Paris, 1883*

5480. **United States—Office of Naval Intelligence.** General Information Series: Information from abroad, No. 11. Report on the exhibits at the Crystal Palace Electrical Exhibition, 1882; by F. J. Sprague. 169 pp. ill. pl. tab. 8vo. *Washington, 1883*
The report deals chiefly with the history, construction and operation of dynamo-electric generators and incandescent lamps.

5481. **United States Signal Service.**—History of the United States Signal Service; with catalogue of its exhibits at the International Fisheries Exhibition, London, 1883. 28 pp. ill. 8vo. *Washington, 1883*

Organization of the International Weather Service.

5482. **Franklin Institute.—International Electrical Exhibition, 1884.** Official catalogue. 92 pp. 8vo. *Philadelphia, 1884*

5482a.——Regulations of the International Exhibition to be held at Philadelphia. 11 pp. 4to. *Philadelphia, 1884*

5483. **Jenkin,** (Henry Charles) Fleeming. (1833–1885.) (Circular to electric lighting exhibitors.) 1 p. 4to. *London, 1884*

—See also 3137.

5484. **London International Health Exhibition, 1884.** Official catalogue. xcv+160 pp. 8vo. *London, 1884*

5485.——Special catalogue of the Education division. lx+130 pp. 7 plates. 8vo. *London, 1884*

List of exhibiting institutions with statistics of their work.

5486. **National Conference of Electricians, Philadelphia, 1884.** Proceedings. viii+300 pp. 16mo. *New York, 1884*

Full revised report of the conference; addresses by Kelvin, Newcomb, Rowland, Preece and others.

5487. **Rayleigh,** (John William Strutt). Address to the President of the British Association for the Advancement of Science. 21 pp. 8vo. *London, 1884*

Survey of recent progress in general physics.
—See also 3793.

5488. **Royal Society, London.** Exhibits at conversazione, June 11, 1884. 4 pp. 8vo. *London, 1884*

5489. **Society of Telegraph Engineers and Electricians.** Conversazione in the Libraries, Museum of Physical Apparatus, Physical Laboratory, and Art Galleries of King's College, London. 8 pp. 4to. *London, 1884*

List of exhibits.
—See also 4909.

5490. **Report,** Second, of the committee appointed for the purpose of determining a gauge for the manufacture of the various small screws used in telegraphic and electrical apparatus, in clockwork, and for other analogous purposes. (Report of British Ass. Adv. Sc., 1884.) 7 pp. 8vo. *London, 1884*

Committee: Joseph Whitworth, W. Thomson, F. J. Bramwell, A. Stroh, Beck, W. H. Preece, E. Crompton, E. Rigg, A. Le Neve Foster, Latimer Clark, H. Trueman Wood and F. Buckney.

5491. **International Inventions Exhibitions, London, 1885.** Division I.—Inventions. Division II.—Music. 20 pp. Folio. *London, 1885*

5492. **International Telegraph Convention, 1885.** International Telegraph Convention with Berlin, revision of service regulations and tariffs, 1885, translated by Alfred Brasher. 111 pp. Folio. *Berlin, (1885)*

International rules regulating the sending of telegrams.

5493. **Mourlon,** Charles (A. M.). L'électricité à l'exposition universelle d'Anvers. Part II. pp. 73–102. ill. 8vo. *Brussels, 1885*

General remarks on dynamos, transformers, thermopiles exhibited at Antwerp.
—See also 5475.

5494. **Society of Telegraph Engineers and of Electricians.** Committee on electrical nomenclature and notation. 1 p. 4to. *London, 1885*

Among the Committee were: Ayrton, Adams, Fleming, Forbes, Hughes, Preece, S. P. Thompson.
—See also 4909.

5495. Mr. Cyrus W(est) **Field's** banquet to the Hon. Edward J. Phelps, the American Minister at the Buckingham Palace Hotel, on July 4th, 1885. 36 pp. 12mo. *London, 1885*

5496. **American Institute of Electrical Engineers.** Prospectus and report of the committee on permanent quarters. 5 pp. 4to. *New York, 1887*

5497. **Jubilee** of the electric telegraph dinner at the Holborn restaurant, on Wednesday, July 27th, 1887. 11 pp. 8vo. *London, 1887*

Toast list and musical program.

5498. **Banquet** to Sir John Pender. Hotel Metropole, April 23d, 1888. (Program.) 4 pp. 8vo. *London, 1888*

List of guests.

5499. **Institution of Civil Engineers.** Dinner to American Engineering Societies in the Guild Hall. Plan of tables. 1 p. Sq. folio. *London, 1889*

Sir John Goode presided.
—See also 5361.

5500. **Institution of Electrical Engineers, London.** First annual dinner at the Criterion. 1 p. Sq. folio. *London, 1889*

Sir William Thomson (Lord Kelvin) presided.

5501. **Langdon-Davies,** (Charles). Le Phonopore. Diagramme explicatif. (Exposition Universelle, Paris, 1889.) 1 plate and 1 p. text (French and English). 8vo. *London, 1889*

—See also 2443.

5502. **Electrical Association.** Rules. 8 pp. 8vo. (First proof uncorrected.) *London, 1890*

5502a.— —(The same.) (Fifth proof.) 8 pp. 8vo. *London, 1890*

5503. **London Chamber of Commerce.** Electrical and allied trades section. List of the committee and members. 4 pp. Folio.
London, 1890

5504. **Chicago, Exhibition, 1893.**—British commission. Official catalogue of the British section, xlii+544 pp. pl. 12mo.
London, 1893
Electricity and electrical appliances by Prof. Ayrton; instruments of precision other than electrical and magnetic by Prof. S. P. Thompson.

WITHOUT DATE.

5505. **Clark,** (Josiah) Latimer. (1822–1898.) Letter referring to the transfer of the Ronald's Library to the Society of Telegraph Engineers. (See No. 2207.)

5506.——Program of lecture on electricity as applied to telegraphy.
—See also 2897.

5507. **Catalogue** of Persian Telegraph Library. 26 pp. 12mo.
List of 890 books in the library.

SECTION X

Trade Catalogues, Circulars and Price Lists

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Trade Catalogues, Circulars and Price Lists

5508. **Pilbrow, James.** Atmospheric railway and canal propulsion and pneumatic telegraphs. Second edition. 42 pp. 3 plates. 8vo. *London, 1844*

5509. **Wall, A.** On Wall's improvements in the manufacture of iron, copper, steel, and other metals by the application of voltaic electricity. ii+46 pp. 8vo. *London, 1846*

In the author's process the impure iron as it flows from the blast furnace is subjected to a strong electrical current. The paper contains a note on the electrical origin of meteoric bodies.

—See also 2854.

5510. **Davis, Daniel.** Catalogue of apparatus, to illustrate magnetism, galvanism, electro-dynamics manufactured and sold by Daniel Davis. 46 pp. ill. 12mo. *Boston, 1848*

—See also 1012.

5511. **Fuller's** patent mercury-bichromate battery. Folio. *1849*

5512. **Société Carpentier et Cie.** Rapports scientifiques et industriels et autres documents authentiques sur la galvanism du fer, procédé Sorel. 94 pp. 8vo. *Paris, 1849*

The Sorel process for galvanizing iron.

5513. **Electric Telegraph Company.** Handbook to the electric telegraph, being a popular explanatory treatise on the construction, nature and powers of this wonder-working instrument, with a full account of its origin and progress; also a drawing and explanation of the electric clock. Third edition. 30 pp. ill. pl. 12mo. *London, (1850?)*

Scale of charges; the electric clock.

—See also 2933.

5514. **Gutta-Percha Company.** Patent gutta-percha tubing. (Circular.) 2 l. 4to. *London, (1850)*

—See also 5540, 5546.

5515. **Sax,** Julius. Illustrated description of new series of telegraph instruments. 34 pp. 8vo. *London, (1850?)*

5516. **Dempster,** Henry. New equilateral triangular telegraph; especially adapted for yachters, coasters, fishermen, etc. Second edition. 64 pp. ill. Sm. 4to. *Edinburgh, 1851*
—See also 2800.

5517. **Shephard,** Charles (Upham). On the application of electromagnetism as a motor for clocks. 24 pp. ill. 8vo. *London, 1851*

5518. **Warson,** Joseph J. W. A few remarks on the present state and prospects of electrical illumination; with a description of the author's patented inventions in galvanic batteries and electric lamps. 31 pp. 8vo. *London, 1853*
The author's *"Chronomatic battery,"* which is the cast-iron battery of Callan modified; notes on electric illumination.

5519. **Railway Electric Signals Company.** (Description of the system.) 13 pp. 2 plates. 12mo. *London, (1855?)*
Railway signals designed and patented by Tyer.

5519a.——(Another edition.) 2 pp. Folio. *London, (1855?)*

5520. **Siebe, Gorman and Company.** Description of diving apparatus and instructions for submarine operations. iv+67 pp. ill. pl. 4to. *London, (1855?)*
Description of electric fuses, torpedoes, igniting apparatus.
—See also 4474.

5521. **Bonelli,** G. Du télégraphe des locomotives de G. Bonelli, système destiné à prévenir les collisions sur les chemins de fer. 16 pp. ill. 8vo. *Paris, 1856*
The author's system of railway signaling.
—See also 4691.

5522. **Elliott Brothers.** Descriptive catalogue of voltaic and thermo-electric instruments and apparatus manufactured by Elliott Brothers. 14 pp. ill. 8vo. *London, (1856?)*
—See also 5589, 5831.

5523. **Godefroy,** P. A. Godefroy's improved gutta-percha. 8 pp. 8vo. *London, 1856–1858*
Prepared cocoa-nut shell added to gutta-percha.

5524. **Hamilton,** John. Improved insulators with metallic arm. 2 pp. 8vo. (Circular.) *Liverpool, 1856*
The invention of Edwin Clark.

5525.——Iron telegraph standards. 2 l. Folio. *Liverpool, (1856?)*

5526. **Knight,** G. & Co. A catalogue of the different apparatus and instruments described in Noad's Manual of Electricity. 24 pp. 8vo. (See No. 1463.) *London, 1857*

5527. **Friend,** M. C. Description of the "Pelorus." Third edition. 16 pp. 8vo. *London, 1858*
The Pelorus is a magnetic instrument for determining the true course of a ship.

5528. **Lo Cicero, Giuseppe.** Nuovo indicatore magneto-elettrico. 7 pp. 1 plate. 8vo. *Palermo, 1858*

Telegraph receiver invented by the author.

5529. **Maynard, Purdy and Slaugther.** Ocean telegraph cable. 2 l. ill. 8vo. *New York, 1858*

5530. **Permanent Way Company.** Description of Boucherie's patent process for preserving timber from decay. 11 pp. 1 plate. 8vo. *London, 1858*

The sap is expelled and the pores of the timber filled with a preservative solution.

5531. **Siemens and Halske.** Description of Siemen's and Halske's submarine apparatus. 88+6+7 pp. ill. 18 plates. 4to. *Berlin, (1858?)*

—See also 4527.

5532. **M'Grade,** Patrick. Extract from a description of a new method of raising and submerging telegraphic cables. (Civil Engineer and Architect's Journ., Vol. 22, p. 324.) 4to. *London, 1859*

The object of the method is to relieve cables from a great part of the strain due to their weight while passing up through the water.

5532a.——Plan for raising or lowering submarine cables without danger of breaking or overstraining them in either operation. 1 plate. Folio. *Dublin, (1860?)*

5533. **Reid,** W. Reid's apparatus for testing the insulation of electric wires. 11 pp. 8vo. *London, 1859*

Specifications of a process for removing the air from the gutta-percha or India-rubber insulation of a cable.

5534. **Silver,** S. W. & Co. Patent caoutchouc telegraph insulator. 11 pp. 8vo. *London, 1859*

5534a.——(Another edition.) 9 pp. 8vo. *London, 1860*

5535.——Report of the proceedings of the meeting held at the Silvertown India-Rubber Works for the purpose of discussing the merits of S. W. Silver & Co's patent caoutchouc insulator. 14 pp. 8vo. *London, 1859*

The value of India-rubber for insulating purposes.
—See also 4449.

5536. **Universal Private Telegraph Company.** Professor Wheatstone's patents. 15 pp. ill. 8vo. *London, (1860)*

The company was formed for the introduction of Wheatstone's "Universal telegraph."

5536a.——(Another edition.) 12 pp. 8vo. *London, (1861)*

—See also 4700.

5537. **Allan,** (Thomas). System of ocean telegraphy. 3 pp. 4to. *London, (1861)*

The author's proposed deep-sea cable.
—See also 3279.

5538. **Berens,** T. Traversée des Montagnes avec l'air comprimé dans les tunnels métalliques. 7+4 pp. 2 maps. Folio.
Milan, 1861

Description of the author's compressed air apparatus.

5539. **Duncan.** Rattan electric telegraph cable. 2 pp. 8vo. (*1861*)
Rattan cane as an external protecting cover for submarine cables.

5540. **Gutta-Percha Company.** Submarine telegraph cables. 2 l. 4to. & Folio. *London, 1861*

5540a.——Submarine telegraph cables which are now in successful working order, the insulated wires for which were manufactured by the Gutta-Percha Company. 1 p. Folio.
London, 1862

—See also 5514.

5541. **Reid Brothers.** Description of two instruments exhibited at the Manchester Exhibition, 1861. 7 pp.. 8vo. *London, 1861*
Plan to remove air bubbles from the gutta-percha insulation of a cable in process of manufacture.
—See also 5691.

5542. **Siemens, Halske and Co.** Alphabetical telegraph. 2 pp. 2 plates. 4to. *London, 1861*
A magneto-electric dial instrument.

5542a.——Alarm for the alphabetical telegraph. 1 l. 4to.
Westminster, 1861

—See also 4527.

5543. **Wilde,** H(enry). The globe telegraph. 2 l. 1 plate. Folio.
Manchester, 1861

With photographic illustration of apparatus.
—See also 3524.

5544. **Opinions** of the press on Dr. Caplain's electro-chemical bath. 8 pp. 12mo. *1861*
The kind of electricity employed in the operation is the electricity of decomposition.

5545. **Glass, Elliot & Co.** List of all the submarine telegraph cables manufactured and laid down by Glass, Elliot and Co. 1 l. Folio. *London, 1862*
Cables laid between 1854 and 1862.

5546. **Gutta-Percha Company.** (Circular relating to insulated telegraph wires.) 3 pp. Folio. *London, 1862*
—See also 5514.

5547. **Henley,** W(illiam) T(homas). (1813?–1882.) Alphabetical telegraph. 7 pp. 4to. *London, (1862)*
—See also 4646.

5548. **Holmes,** F(red.) H(ale). Holmes' magneto-electric light, as applicable to lighthouses. 34+x+ii pp. 8vo. *London, 1862*
Description of Professor Holmes's magneto-electric machine; installation at the South Foreland; advantages of the electric light.

5549. **Hooper, William.** Short description of Mr. Hooper's submarine telegraph cables, with extracts from government report. 12 pp. 2 plates. 4to. *(London,) 1862*

India-rubber as an insulating material for cables.

5549a.——(French translation.) 12 pp. 2 plates. 4to. *(London,) 1862*

—See also 3546.

5550. **South Eastern Railway.** Electric telegraph. 1 l. Folio. *London, 1862*

—See also 4395.

5551. **Wells and Hall.** Caoutchouc insulated telegraph wires. 3 pp. 4to. *London, 1862*

—See also 3185.

5552. **Beardslee's** military telegraph, the history of its invention, introduction, and adoption by the government of the United States. 21 pp. ill. 8vo. *New York, 1863*

Portable telegraph for military and naval purposes.

5553. **United Kingdom Electric Telegraph Company.** The type printing instrument, descriptions and opinions of the press. 24 pp. 8vo. *London, 1863*

The printing telegraph of Prof. Hughes.

—See also 4567.

5554. **Adams, W. S. & Son.** On electric bells for domestic use. 16 pp. ill. 8vo. *London, (1864)*

—See also 5586.

5555. **Bellett, P. Louis & Charles Rouvre.** Notice sur le nouveau système de locomotive électro-magnétique. 16 pp. 1 plate. 8vo. *Paris, 1864*

Early electric locomotive.

5556. **Bonelli's** typo-electric telegraph. Extracts from the public journals, English and foreign. 2 pp. Folio. *London, 1864*

—See also 4691.

5557. **Hooper, William.**—Reports on Hooper's submarine telegraphic cable from Charles Bright and Latimer Clark, Prof. Miller, Prof. Thomson and Wildman Whitehouse. 18 pp. 4to. *London, 1864*

5557a.——(Another edition.) 25 pp. pl. 4to. *London, (1868?)*

—See also 3546.

5558. **Salleron, J(ules).** Notice sur les instruments de précision. Parts III, IV. Pesanteur-Hydrostatique—Calorique-Mécanique. ill. 8vo. *Paris, 1864*

Catalogue of scientific apparatus with explanatory notes.

5559. **Thompson, J. Baynes.** Electro-magnetic induction machine. 8 pp. 4to. *London, 1864*

Use of the machine; press notices.

—See also 1608.

5560. **Guérard,** A. Appareils respiratoires de M. Galibert. 31 pp. 8vo. *Paris, 1865*

Galibert's apparatus affording supply of air for breathing purposes.

5561. **Hooper,** W(illiam). Telegraph cables. 1 l. Folio. *London, (1865?)*

5561a.——Telegraph cables. 2 pp. 4to. *London, 1866*

5562.——Telegraph cables, comparative insulation and induction of Mr. Hooper's patent India-rubber core, with that of a gutta-percha core. 2 l. 4to. *London, (1865?)*

—See also 3546.

5563. **Siemens, Halske and Co.** Tubular iron telegraph posts. 2 pp. 1 plate. 4to. *London, 1865*

—See also 4527.

5564. **Fenwick,** Thomas. Improved submarine telegraph cable. 1 p. 8vo. *Stockton-on-Tees, 1866*

—See also 662.

5565. **Allan,** Thomas. Deep sea telegraphy. Comparison between the cable submerged from Ireland to Newfoundland in 1866 by the Telegraph Construction and Maintenance Company and that proposed on Allan's principle for the same distance and depth. 2 pp. Folio. *(1867?)*

—See also 3279.

5566. **Colomb.**—Colomb's flashing signals. Fourth edition. 22 pp. ill. 1 plate. 8vo. *London, 1867*

5566a.——(Another edition.) 42 pp. ill. 8vo. *London, (1870?)*

—See also 5582, 5588.

5566b. **Colomb and Bolton.**—Testimonials as to the value of Colomb and Bolton's flashing signals by day, by night and in fogs. 5 pp. 8vo. *London, 1867–1872*

In laying the Atlantic cable of 1866 all the ships were furnished with Colomb's flashing signals.

—See also 5566.

5567. **Hooper,** William. Electrical induction of Mr. Hooper's insulated wires, compared with gutta-percha insulated wires for telegraphic cables. 9 pp. 1 table. 4to. *(London, 1867)*

5568.——On the relative cost and durability of Mr. Hooper's insulated wires and gutta-percha. (Engineering, May 24, 1867.) 8vo. *London, 1867*

India-rubber for insulation.

—See also 3546.

5569. **Nicoll,** Donald. System of underground telegraphy. 1 l. 8vo. *Kilburn, (1867)*

Circular on the author's system of underground telegraph conductors in which the insulating material is Trinidad bitumen.

5570. **Spon,** Edward & F. N. **Spon.** Catalogue of scientific books. iv+ 118 pp. 8vo. *London, 1867*

5571. **Chester,** Charles T. & J. N. **Chester.** Catalogue of telegraph material. 47 pp. ill. 8vo. *New York, 1867*

5571a.— —**Chester,** Charles T. Catalogue of telegraph material. 56 pp. ill. 8vo. *New York, 1873*

5572. **(Hudson, F.) (Nicoll's)** new underground telegraph system. 12 pp. 8vo. *London, (1868?)*

In this system the conducting wire is insulated by means of bituminous compound.

5573. **Patent Tunneling and Mining Machine Company.** Machine à perforer les roches pour le percement des tunnels et galeries de mines inventée par M. Penrice. Rapport de la commission à son excellence Mons. le Ministre de l'Agriculture. Avec une note par M. Fellot. (Extrait des Mém. Compte-rendu des Travaux de la Soc. Ingén. Civils, 1868.) 25 pp. 2 plates. 8vo. *Paris, 1868*

Description and operation of the drill.

5574. **Warden,** W(illiam) M. & Co. Illustrated descriptive catalogue of electrical instruments, materials, and apparatus used in construction of electric telegraphs. 56 pp. ill. 8vo. *London, 1868*

—See also 4428.

5575. **Berlioz,** Auguste. La Compagnie l'Alliance. 46 pp. 8vo. *Paris, 1869*

The machine of the *Alliance* Company and the application of the current to various industries.

5576. **Siemens Brothers.** Insulators for iron posts. 1 p. ill. 4to. *London, (186–)*

—See also 4445.

5577. **Silver,** (S. W.) & Co. Submarine insulation. 2 pp. 8vo. *London, 186–*

Insulating qualities of India-rubber.
—See also 4449.

5578. **Tyer,** Edward. Descriptive catalogue of train signalling. 23 pp. ill. 12mo. *London, 186–*

—See also 4698.

5578a. **Tyer,** Edward & J. M. **Norman.** Tyer's patent train signalling telegraph. 3rd edition. 54 pp. ill. 12mo. *London, (1870)*

(Autograph copy.)

5578b.— —4th edition. 96 pp. 3 plates. 2 tables. 12mo. *London, 1873*

(Autograph copy.)
—See also 4698.

5579. **Description** of Siemens' universal galvanometer. 8 pp. 1 plate. 8vo. *London, 1870*

Galvanometer for measurement of current *e.m.f.* and resistance.

5579a.— —(The same.) 10 pp. 2 plates. 8vo. *London, (1870?)*

5580. **Foucaut.**—Cables télégraphiques, nouveau procédé de construction permettant l'emploi de conducteurs multiples (cable Foucaut). 15 pp. 8vo. *Havre, 1871*

5581. **Tommasi,** Ferdinando. The hydro-electric submarine cable. 38 pp. 7 plates. 8vo. *London, 1871*

The cable consists of a number of small copper tubes coated with red lead and bound together in a succession of cork cylinders; water is used for the transmission of signals.

5581a. ——(The same.) (Extrait du Journ. les Mondes, Oct. 3, 1872.) 12 pp. ill. 8vo *Paris, 1872*

5582. **Colomb.**—Description of the oxy-calcium light, as fitted for use with Commander Colomb's flashing signals. 5 pp. 8vo. *London, 1872*

5582a. ——Flashing signals adapted to the international code, for use in the mercantile marine, by day, by night and in fog. 16 pp. ill. 8vo. *London, 1872*

—See also 5566.

5583. **Darlow,** F. W. Magnetine; or, the Skeuasma improved. 32 pp. ill. 12mo. *London, (1872?)*

5584. **Russell,** F. & Co. Illustrated descriptive catalogue of electrical instruments, material and apparatus, used in the construction of electric telegraphs. 28 pp. ill. 4to. *London, 1872*

—See also 5590, 5842.

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5585b. ——(The same.) 16 pp. 8vo. *London, (1879)*

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—See also 5554.

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—See also 5522.

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—See also 5584.

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—See also 5601.

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—See also 4452.

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—See also 2897, 3709.

5595. **India-Rubber, Gutta-percha, and Telegraph Works Company.** Illustrated and descriptive catalogue of the telegraph apparatus and stores. 48 pp. 29 plates. 4to. *London, 1874*
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—See also 5104.

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5715. **Maiche, Louis.** Notice sur les piles électriques et leurs applications. 24 pp. plate. L.8vo. *LeMans, 1882*

Brief description of the author's battery with commercial application.

5716. **Marschall, Sons & Co.** Industrial catalogue. Price list of steam engines and machinery. 66 pp. ill. L.8vo. *London, 1882*

5717. **"Pilsen," "Joel" and General Electric Light Company.** Illustrated catalogue. 24 pp. 8vo. *London, 1882*

Lamps, dynamos, various data.
—See also 4903.

5718. **Ransomes, Head and Jeffries.** Steam engines for driving electric machinery. 21 pp. ill. L.8vo. *London, 1882*
—See also 5690.

5719. **Rowatt and Fyfe's Electric Light Company.** Joel's incandescent electric light. (In three languages, French, English and German.) 4 pp. ill. 4to. *London, 1882*

5720. **Siemens Patent Gas Light Company.** Siemens new gas-light. 4 pp. ill. Folio. *London, 1882*

5721. **Siemens and Halske.** Elektrische Maschinen und Zubehoer. 30 pp. ill. L.8vo. *Berlin, 1882*

5722.— —Reproduction de l'unité de résistance à mercure et relation du système des mesures électriques en usage dans l'établissement de Siemens et Halske à Berlin. 16 pp. ill. 4to. *Berlin, 1882*

Mercury unit of resistance.
—See also 4527.

5723. **South Eastern ("Brush") Electric Light and Power Company.** Electric lighting by the "Brush" system. 54 pp. ill. 8vo. *London, 1882*

—See also 4911.

5724. **Spottiswoode,** W(illiam). (1825–1883.) App's patent inductorium. 2 pp. 4to. *Paris, 1882*
—See also 3797.

5725. **Phosphor-bronze** for telephone wires. (From the Engineering.) 2 pp. Folio. *London, 1882*

5726. **Aluminum Crown Metal Company.** Sole manufacturers of Webster's improved bronzes, aluminum and bismuth. 64 pp. 12mo. *London, 1883*

5727. **Anglo-American "Brush" Electric Light Company.** Price list of dynamos, lamps, fittings and apparatus. 40 pp. ill. 4to. *London, 1883*

—See also 4847.

5728. **Arnould and Tamine.** Accumulateurs électriques. 7 pp. ill. 8vo. *Mons, 1883*

5729. **de Branville & Co.** Pile à oxyde de cuivre. (Circular.) 12 pp. ill. 8vo. *Paris, 1883*

A new primary cell.

5730. **Brown and Sharpe Manufacturing Company.** Catalogue and price lists. 113 pp. ill. 16mo. *Providence, 1883*
—See also 5648.

5731. **Clark,** (Josiah) Latimer, **Muirhead & Co.** List of telegraph instruments, etc. 4 pp. 4to. *London, 1883*

—See also 4509.

5732. **Companie Générale d'Electricité, Bruxelles.** (Circular.) 44 pp. ill. 8vo. *Brussels, 1883*

Jablochkoff lamps, other arcs, Gramme machines, etc.

5733. **Edison Electric Pen and Writing Agency.** The Edison electric pen and duplicating press, for the rapid, accurate and economical production of all kinds of writings, drawings, etc. 21 pp. 8vo. *London, 1883*

5734. Electric light. (Journ. of Electric Lighting, Vol. I, No. 1, pp. 129–144.) 12mo. *London, 1883*

5735. **Electro-Amalgamator Company.** Barker's patent.—Extraction of gold and silver from their ores. 23 pp. 8vo. *London, 1883*

5735a.——(Opinion of the press upon public experiments.) 18 pp. 12mo. *London, 1883*

5736. **Electro-Dynamic Company.** Catalogue on use of the Griscow motor. 47 pp. ill. 16mo. *Philadelphia, 1883*

—See also 5766.

5737. **Elmore,** William. Catalogue of chemicals, polishing material, machinery, apparatus and appliances used in nickel-plating and in the electro-deposition of metals by battery and by the "Elmore" dynamo electric machine. 37 pp. ill. 8vo. *London, 1883*

5737a.——Estimates for electro-plating outfits. 12 pp. 12mo. *London, 1883*

—See also 3935.

5738. **Elphinstone and Vincent.** Continuous current dynamo-electric machines. 20 pp. ill. 8vo. *London, 1883*

—See also 5767.

5739. **Gaulard,** (Lucien) & (J. Dixon) **Gibbs.** Distribution of electricity by the secondary generators. 3 pp. 4to. *London, 1883*

5740.——The duplex electric lamp. 2 pp. 4to. *London, 1883*

5740a.——The double-current electric lamp. 1 p. 4to. *London, (188–)*

Formerly known as the Duplex lamp.

5741. **Jolin and Parsons.** Patent improved electric arc lamp with description and report by Silvanus P. Thompson. 12 pp. 3 plates. 12mo. *Bristol, 1883*

5742. **Maxim—Weston Electric Company.** (Circular.) 8 pp. ill. 8vo. *London, 1883*

Incandescent and arc lighting systems.

5743. **Phosphor-Bronze Company.** On electrical conductors. 1 p. Folio. *London, 1883*
The use of phosphor bronze. Abstract of a paper by Sir William H. Preece.
—See also 5688.

5744. **Ross Primary Battery.** 3 pp. Folio. *London, 1883*

5745. **Ruston, Proctor & Co.** Special compound engines for driving electric light machinery. 16 p. ill. L.8vo. *London, 1883*

5746. **Sanderson & Co.** Tall-chimney climbing and lightning-rod testing. 32 pp. ill. 8vo. *London, 1883*

5747. **Sennett, A(lfred) R(ichard) & Co.** Electric lighting. 16 pp. ill. L.8vo. *London, 1883*
Incandescent lighting.
—See also 5774.

5748. **Siemens Brothers & Co.** Price list of magneto- and dynamo-electric machines for electro-deposition and other purposes. 7 pp. 8vo. *London, 1883*
—See also 4445.

5749. **Standard Electric Manufacturing Company.** The Delany synchronous multiplex telegraph system. 12 pp. 3 plates. L.8vo. *New York, 1883*

5750. **Swan United Electric Light Company.** Illustrated catalogue. 20 pp. 4to. *London, 1883*

5751. **Telegraph Construction and Maintenance Company.** Circular. 2 pp. 4to. *London, 1883*
—See also 4456.

5752. **United States Telephone Manufacturing Company.** General circular. 15 pp. 8vo. *New York, 1883*

5753. **Van Depoele Electric Light Company.** Dynamo electric machines, electric lamps and electro-plating apparatus. 34 pp. ill. 8vo. *Chicago, 1883*

5754. **Spellier's** system of time telegraphy and its superiorities. 12 pp. ill. 8vo. *Cleveland, 1883*
Electro-magnetic escapement.

5755. **Ayrton, (William Edward) & (John) Perry.** Patent electro-motors. Direct reading, magnifying, spring meters and volt-meters. 3 pp. Folio. *London, 1884*
—See also 3791, 3858.

5756. **Belfast Electric Appliances Company.** Empire carbons. 2 pp. 4to. *Belfast, 1884*

5757. — —The Belfast arc lamp. 1 p. 4to. *Belfast, 1884*

5758. **Chassevent, C.** Lampes électriques universales. Trouvé desureté, portatives, automatiques, réglables et inversables. 16 pp. ill. 8vo. *Paris, 1884*
Illustrated account of the *Trouvé* lamp.

5759. **Clark,** (Josiah) Latimer, **Muirhead & Co.** New and improved complete system of submarine mining for coast defences, etc. 26 pp. ill. pl. L.8vo. *London, 1884*
Description and illustration of subsaqueous mines together with necessary instruments and appliances.
—See also 4509.

5760. **Crompton,** R. E. & Co. Electric lighting plant Crompton system. Arc lighting, incandescent lighting, conductors, measuring instruments, motive power. 34 pp. ill. 8vo. *London, 1884*
—See also 5677.

5761. **Edison and Swan United Electric Light Company.** Price list of lamps and dynamos. 2 pp. 4to. *London, 1884*

5762. **Edison Electric Light Company.** The Edison-Hopkinson dynamo. 14 pp. 1 plate. 4to. *London, 1884*
Description for commercial purposes of this type of dynamo.

5763. **Electric Appliance Company.** Temporary descriptive price list. 22 pp. ill. 8vo. *London, 1884*
Bells, contacts, alarms and small electric motors.

5764. **Electric "Sun" Lamp and Power Company.** Application of the system in London. 27 pp. pl. ill. 4to. *London, 1884*

5765. **Electrical Power Storage Company.** Price list of special types of E. P. S. accumulators. 2 pp. 8vo. *Millwall, 1884*
—See also 4883.

5766. **Electro-Dynamic Company (Philadelphia).** Electric power for sewing machines, dentist's drills, fans, blowers, lathes, etc. 47 pp. ill. 16mo. *London, 1884*
—See also 5736.

5767. **Elphinstone and Vincent.** Dynamo-electric machine. Prospectus and price list. 4 pp. Folio. *London, 1884*
—See also 5738.

5768. **Frost,** A(fred) J. Description, price lists and testimonials of Clark's patent improved transit instruments for obtaining true time. 18 pp. ill. 12mo. *London, 1884*
—See also 5333.

5769. **Hoepli,** Ulrico. Scelta di opere riguardanti l'elettricita e tutti i suoi rami. 19 pp. 8vo. *Milan, 1884*
List of works on electricity and its practical applications.

5770. **Lessing,** Alb. Preis-Liste der Fabrik galvanischer Kohlen und Apparate. 7 pp. 8vo. *Nuremberg, 1884*

5771. **Mourlon,** Charles (A. M.) Système de télégraphie et du téléphonie simultanées par les mêmes fils de F. van Ryssel-berghe. 35 pp. 8vo. *Brussels, 1884*
General description of the use of a line for telegraph and telephonic purposes at the same time.
—See also 5474.

5772. **P(earse,) J. (Walter).** Lightning conductors on the Melsens system. 14 pp. ill. 8vo. *London, 1884*
The system consists in surrounding the building with a kind of metallic cage formed by many conductors of sectional area and provided with numerous pointed rods.

5773. **"Pilsen" Electric Light Company.** Notes on the exhibits of the "Pilsen" Electric Light Company at the International Health Exhibition. 6 pp. 8 plates. 4to. *London, 1884*
Various types of the Pilsen arc-lamp.

5774. **Sennett, A(lfred) R(ichard) & Co.** Electric lighting. Illustrated catalogue. 16 pp. 8vo. *London, 1884*
—See also 5747.

5775. **Smith T. Tayler.** Notes on domestic electric lighting. 5 pp. 3 plates. 4to. *Holborn, 1884*
The author's system of electric fittings.

5776.— —Notes on the economic means of domestic electric lighting. 8 pp. 8vo. *London, 1884*
The author's "portable" (electric) lamps.

5777. **Timmis, Illius A.** The "Currie" long-pull electro-magnet for working railway signals, railway breakes, steam valves, water cocks. 11 pp. 4 plates. 4to. *Westminster, 1884*

5778. **Woodbury Permant Photographic Printing Company.** Photograph of Brush dynamo. *London, 1884*

5779. **The Electrician** electrical trades' directory with handbook. Vols. 2, 7, 8. L.8vo. *London, 1884, 1889, 1890*
Obituary notices of Breguet, Plateau, Sabine, Siemens, Spottiswoode, Cromwell Varley.

5780. **Clark, (Josiah) Latimer, Muirhead & Co.** Illustrated catalogue of telegraphic materials, electrical instruments, etc. 80 pp. ill. L.8vo. *London, 1885*
—See also 4509.

5781. **Elwell-Parker.** Price list of Planté-Elwell-Parker secondary batteries or electric accumulators.—Elwell-Parker dynamo-machines. 8 pp. 16mo. *Wolvershampton, 1885*

5783. **Siemens Brothers & Co.** Magneto-inductor and bridge, for testing lightning conductors. 11 pp. 1 plate. 8vo. *London, 1885*
—See also 4445.

5784. **The Lalande-Spence** primary battery. 66 pp. ill. 8vo. *London, 1885*

5785. **Telemeter Company.** The Telemeter system. 40 pp. ill. 4to. *New York, 1886*

5786. **Callender & (Charles Edmund) Webber.** The distribution of electricity by conductors placed underground. 3 pp. 1 plate. 4to. *London, 1887*
—See also 3748.

5787. **Eaton, A. K.** Illustrated price list of instruments for electrical measurements. 16 pp. ill. 8vo. *Brooklyn, 1887*
Optical and electrical standard instruments.

5788. **Electric Telephone Co.** The speaking telephone: being a brief account of "Telephony." 14 pp. ill. 12mo. *London, 1887*

5789. **Little and Hale.** Electrical communication between lightships and the shore. 8 pp. 5 plates. 4to. *London, 1887*

5790. **Mourlon & Co.** Téléphonie interurbaine et internationale par le système Van Rysselberghe. 14 pp. 8vo. *Brussels, 1887*
List of places in Europe in which the author's system for the simultaneous transmission of telephonic and telegraphic messages is used.

5791. **New Telephone Company.** Professor Silvanus P. Thompson's patent telephone. 10 pp. 4to. *London, 1887*

5792. **Brooks Underground Telegraph Construction Company.** On a new system of underground electrical conductors. 17 pp. ill. 8vo. *Philadelphia, 1888*
Some details of tests for capacity and insulation resistance.

5793. **Drake and Gorham.** Price list of Berthoud-Borel lead covered cables. 1 p. 4to. *London, 1888*

5794. **Electrical Power Storage Company.** The storage system of electrical supply. 61 pp. ill. 8vo. *London, 1888*
—See also 4883.

5795. **Elmore's Patent Copper Depositing Company.** Manufacturers of seamless copper tubes and cylinders. (Advertising catalogue.) 24 pp. 12mo. *London, 1888*

5796. **India-Rubber, Gutta-Percha and Telegraph Works Company.** Price list of electric light cables and wires. 8 pp. 4to. *London, 1888*
—See also 4432.

5797. **Institute of Medical Electricity.** Prospectus. 9 pp. Folio & 4to. *London, 1888*
—See also 5805.

5798. **Kinetic Engineering Company.** Electric lighting. Catalogue and price list. 12 pp. ill. 4to. *London, 1888*

5799.— —Prospectus and price list. 24 pp. 4to. *London, 1888*
Licenses of Berthoud-Borel cables.
—See also 4525.

5800. **Waring.** Underground electric system. 39 pp. 8vo. (*London,*) *1888*

5801. **Weedon and Irish.** Catalogue and descriptive price-list of electrical appliances. 104 pp. ill. 8vo. *Sunderland, 1888*

5802. **Woodhouse and Rawson Electric Supply Company of Great Britain.** Domestic electrical supplies. 109 pp. ill. 8vo. *London, (1888)*
—See also 5808.

5803. **Collettee,** Auguste. Report of experiments with the phonopore of Mr. Langdon-Davies, made for the information of the telegraph department on the lines of the Government of the Netherlands in Dec., 1889. 6 pp. 3 plates. Folio.
(London,) 1889

5804. **House-to-House Electric Light Supply Company.** The advantages of the electric light in residences, clubs, etc. 64 pp. 16mo.
London, (1889)
—See also 4950.

5805. **Institute of Medical Electricity.** (Advertising catalogue.) 12 pp. 12mo. *London, 1889*
—See also 5797.

5806. **Mora,** Francesco. Langdon-Davies phonopore. Translated from the Official Journal of the Telegraph Department of Spain into English. (Manuscript.) 8 pp. Folio. *1889*

5807. **White, James.** Sir William Thomson's new standard electric instruments. *Glasgow, 1890*
Standard Ampère-balances; electrostatic voltmeter.

5807a.— —Sixth edition. 51 pp. 8vo. *Glasgow, 1890*

5807b.— —Sir William Thomson's tangent galvanometer, made by James White. 4 pp. 8vo. *Glasgow, (1889)*
Note on a method of determining battery resistance.

5807c.— —Price lists of Thomson's electro-meters, electrostatic voltmeters, multicellular electrostatic voltmeter, direct reading-instruments. *Glasgow, 1890*

5808. **Woodhouse and Rawson Electric Supply Company.** Contractor's electrical supplies list B. Second edition. 222 pp. ill. pl. 8vo. *London, 1889*
—See also 5802.

5809. **Clark,** (Josiah) Latimer, **Muirhead & Co.** Cardew's system of dynamo winding. 1 p. 4to. *Westminster, (188–)*

5810. **Garratt,** B. C(opson). Hints on health. (Circular on this book.) 3 pp. 8vo. *London, (188–)*
The extracts given refer to the author's method of magnetic treatment.
—See also 4065.

5811. **Kinetic Engineering Company.** Powell's battery. 1 p. 4to.
London, (188–)
—See also 4525.

5812. **Simplex Electric Light and Plant Company.** Simplex arc and incandescence lamps. 3 pp. Folio. *London, (188–)*

5813. **Telpherage Company.** Prof. Fleeming J. Jenkin's report. (On the telpherage.) 4 pp. 4to. *London, (188–)*
On experimental lines at Weston.

5814. **Western Electric Manufacturing Company.** Telephonic apparatus. 11 pp. ill. 8vo. *Chicago and New York, (188–)*
—See also 5608.

5815. **Apps,** Alfred. The cost of arc lighting installations and maintenance reduced by 50 per cent. (Lewellyn Saunderson's electric lamp.) 3 pp. 4to. *London, 1890*

5816. **Lane-Fox,** (St. George). Lane-Fox system of electrical distribution. (English patent No. 3988.) 15 pp. 8vo. *London, 1890*

Remarks by Sir William Thomson, Preece, Latimer Clark, and others.
—See also 4183.

5817. **Standard Time and Telephone Company.** Descriptive catalogue and price list. Synchronizing apparatus, flashing signals, clocks, telephones, etc. 17 pp. ill. 8vo. *London, 1890*
—See also 4914.

5820. **United Electric Wire Company.** Wholesale catalogue and price list. 8 pp. 8vo. *London, 1890*

5821. **Woodhouse and Rawson.** New primary battery for electric lighting. 7 pp. 8vo. *London, 1890*
—See also 4947.

5822. **Schonheyder,** William. Thermal storage, reports. 14 pp. 8vo. *London, 1893*

Druitt Halpin's system for equalizing the work required from steam-boilers when the demand for steam varies.

5823. **Thermal** storage, reports and press notices. 46 pp. ill. 4to. *London, 1893*

Reports on Mr. Druitt Halpin's system by Forbes, Unwin and others. (Autograph copy.)

WITHOUT DATE.

5824. **Alix,** Etienne. (Engraver. Illustrative cuts.) (Advertising-sheet.) Sq. folio.

5825. **Barrand and Lunds.** Synchronizing clocks. List of subscribers. 4 pp. 8vo.

5826. **Carpentier,** J. Ampères-metres. Deprez et Carpentier. (Circular.) 4 pp. ill. 4to. *Paris*

5827. **Chamberlain and Hookham.** Electric light engineers. (Dr. Hopkinson's current meter.) 8 pp. ill. 4to. *Birmingham*

5828. **Clark,** (Josiah Latimer) (1822–1898) and (John) **Standfield.** Patent tubular floating dock. French and English. 4 pp. 2 plates. 4to.
—See also 2897, 5097.

5829. **Crompton,** R. E. & Co. Price list of Kapp and Crompton's current and potential indicators. 1 p. 8vo. *London*
—See also 5677.

5831. **Elliott Brothers.** Descriptive catalogue of electrical instruments and apparatus manufactured by Elliott Brothers. 19 pp. ill. 8vo. *London*

Static electric machines, electrometers and lecture apparatus and toys illustrative of electrostatic phenomena.

5832.— —Descriptive catalogue of magnetic, electro-magnetic, electro-dynamic, and magneto-electric inductive instruments and apparatus manufactured by Elliott Brothers. 19 pp. ill. 8vo. *London*

5833.— —General illustrated catalogue with supplementary lists of philosophical, optical, and mathematical instruments, manufactured by Elliott Brothers. 131 pp. ill. 8vo. *London*
For lectures and experiments. Transits. Acoustical instruments.

5834.— —List of prices. 4pp. 8vo. *London*
Various experimental electric apparatus.
—See also 5522.

5835. **Elliott,** William & Sons. List of mathematical, optical, and philosophical instruments manufactured by William Elliott and Sons. 4 pp. 12mo. *London*

5836. **Engert,** A. C. Patent inventions for the improvement of sound by the aid of tuned steel wires and plates. 4 pp. 8vo. (*London*)

5837. **George,** E. Nouvel appareil télégraphique, système E. George. 4 pp. ill. 8vo. *Paris*
Improved form of telegraph.

5838. **Home,** Thomas. (Handbill advertising the galvanic and electro-magnetic telegraphs on the Gt. Western railway.) 1 l. 8vo. *London*

5839. **Irish,** W. E. Irish's alphabetical type printing and letter indicating telegraph instrument. 1 p. 8vo. *London*

5840. **Lee,** (Robert Bristow), & **Rogers.** Specification-drawings of Riband post. 1 plate. Folio. *Manchester*
—See also 3726.

5841. **Negretti,** (Henry), and the Zambra's patent hourly recording thermometrical apparatus. (Circular.) 4 pp. ill. 8vo.

5842. **Russell,** F. & Co. Electric repeater or distant signal indicator. (For railways.) (Circular.) 1 l. 4to. *London*
—See also 5584.

5843. **Siemens Brothers'** alphabetical telegraphs. 4 pp. pl. 4to. *London*
—See also 4445.

5844. **Siemens and Halske.** Telegraphen- Signal- und Sicherungs-Einrichtungen fuer Eisenbahnen. 34 pp. 6 plates. ill. L.8vo. *Berlin*
Apparatus for electric signaling on railways with numerous illustrations.

5845.— —Price list and drawings, labeled Telegraphische Zeichnungen, E. Roschenbusch. 45 plates. 4to.
—See also 4527.

5846. **Waelput,** O. Construction et placement de paratonnerres perfectionnés, brevetés. 11 pp. 8vo. *Gand*
The author's system of lightning conductors.

5847. **Wells and Hall.** Price list of India-rubber insulation and of wire. 16 pp. 8vo. *London*
—See also 3185.

5848. **Western Electric Manufacturing Company.** Electro-medical and surgical apparatus. 32 pp. ill. 8vo.
Chicago and New York
—See also 5608.

5849. **Whitehouse,** (Edward William Orange) & (Latimer Josiah) **Clark.** (Circular relating to electrical recorder.)
—See also 2897, 3709.

5850. **Windsor Foundry and Iron Works.** Iron telegraph standards; Hamilton's patent. 2 pp. ill. Folio. *Liverpool*

5851. **Zanni.**—Description of Zanni's magneto-electric bell-pull. 1 p. 4to. *London*
—See also 5618.

5852. **Zenger,** Ch(arles) von. Symmetrische Blitzableiter. 2 pp. 4to. *Prague*
Note on the author's system of protecting buildings from lightning.
—See also 3272.

SECTION XI

Periodicals

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Periodicals

5853. **Albany Institute, Transactions.** 8vo. *Albany, 1830–1893*
Vol. 1, Vol. 2, No. 1. 1830–1833.
The *Transactions* complete comprise 12 volumes, covering the years 1830-1892. Vol. 1, pp. 22-24, contains the first paper written by Joseph Henry, entitled "On Some Modifications of the Electro-magnetic Apparatus," in which he proposes the use of a plurality of turns of wire to intensify the effect of a magnet, instead, as proposed by Sturgeon (Annals of Philosophy, Vol. 12, p. 357), of using a single turn and large current for the same purpose. The paper was read before the Institute, Oct. 10, 1827. Vol. 1 also contains a paper by Gen. Schuyler, presented April 27, 1825, entitled "Table of Variations of the Magnetic Needle," giving the results of observations at Boston, Falmouth and Penobscot, which indicated a sudden change in the rate of variation of magnetic declination.
The Albany Institute was formed in 1824 by the union of the Society for the Promotion of Useful Arts (founded 1791 and incorporated 1793) and the Albany Lyceum of Natural History (founded 1823). The Institute was incorporated in 1829. In 1900 it united with the Albany Historical and Art Society to form the Albany Institute and Historical and Art Society.

5854. **American Electrical Society, Journal.** Including original and selected papers on telegraphy and electrical science. Published irregularly. 8vo. *Chicago, 1875–1880*
Vols. 1–3. Complete.
Vol. 1 was published during the years 1875-1877; Vol. 2, 1878-1879; Vol. 3, 1880. Vol. 3 consists of one number only. The *Journal* was published by a Committee consisting of Messrs. Wm. H. Smith, F. W. Jones, and E. Barton.

5855.† **American Electrician.** A journal of practical electrical and steam engineering. Sm. folio. *New York, 1896–1905*
Vols. 8–17. Complete.
AMERICAN ELECTRICIAN. With which is incorporated *Electrical Industries.* An illustrated journal devoted to practical electricity. Vols. 8, 9, May, 1896-Dec., 1897. Continuation of *Electrical Industries* (No. 5882). In 1897, absorbed *Electrical Doings* (monthly, April, 1896-Feb., 1897).—An illustrated monthly journal of practical electrical engineering. Vol. 10, Jan.-Dec., 1898.—A journal of practical electrical and mechanical engineering. Vols. 11, 12, Jan., 1899-Dec., 1900.—A journal of practical electrical and steam engineering. Vols. 13-17, Jan., 1901-Dec., 1905.
Editors: May, 1896-March, 1899, W. D. Weaver (July-October, 1898, Geo. T. Hanchett); April, 1899-July, 1900, J. E. Woodbridge; August, 1900-Dec., 1905, Cecil P. Poole.
In January, 1906, the journal was absorbed by the *Electrical World and Engineer,* with change of title to *Electrical World* (No. 5887). A monthly edition of the consolidated periodical, issued from Jan., 1906, continues the volume numbering of the former monthly.

5856. **The American Journal of Science.** *New Haven, 1818–date*
Series I, Vols. 29 to 38, 1826–1840. Now complete through gift of Dr. Cary T. Hutchinsen, and additions from Library file.

THE AMERICAN JOURNAL OF SCIENCE. More especially of mineralogy, geology, and other branches of natural history; including also agriculture and ornamental as well as useful arts. Conducted by Benjamin Silliman. Series I, Vol. 1. Quarterly, consisting of four numbers. New York and New Haven, 1818. (Library volume is second edition, 1819.) The journal appeared first in July, 1818.

THE AMERICAN JOURNAL OF SCIENCE AND ARTS. Conducted by Benjamin Silliman. Vols. 2 and 3. Half-yearly. New Haven, 1820, 1821. The first number of Vol. 2 was not published until April, 1820. Vols. 4 to 49 (1822-1845). Quarterly. Vol. 50 is the general index to the entire first series.—From Vol. 34, July, 1838, conducted by Benjamin Silliman, aided by Benjamin Silliman, Jr.—Vols. 40 to 43 (1841-1842), bear on the title page the note: To be continued quarterly.—Vols. 1 to 12 were published as follows: Vol. 1, 1818 (second edition, 1819); 2, 1820; 3, 1821; 4 and 5, 1822; 6, 1823; 7 and 8, 1824; 9, 1825; 10 and 11, 1826; 12, 1827; from Vol. 13 to 49 two vols. per year were regularly published.

SERIES II. Conducted by Benjamin Silliman, Benjamin Silliman, Jr., and James Dana. Vols. 1 to 50, 1846-1870. Bi-monthly. Index for each ten vols.—From Vol. 39 on, conducted by Benjamin Silliman and J. Dana.—Vol. 40 reads also, whole number 90, and Vols. 41 to 50, whole number 91 to 100, or Nos. 121 to 150.

SERIES III. Vols. 1 to 18, 1871-1879. Monthly, with index to Vols. 1 to 10.—Vols. 1 to 10 read also, whole number 101 to 110, or No. 1 to 60. Edited by J. Dana and B. Silliman.—Vols. 11 and 12, 1876, read also, whole number 111 and 112. Vols. 13 to 18, read also, whole number 113 to 118, or No. 73 to 108.—From Vol. 16, 1878, edited by J. D. and E. S. Dana and B. Silliman.

THE AMERICAN JOURNAL OF SCIENCE. Series III, Vols. 19 to 50; also, whole number 119 to 150 or, No. 109 to 300, 1880-1895. Index for each ten vols.—Vols. 41 to 44 bear on title page: Established by Benjamin Silliman in 1818.—From Vol. 41, 1895 on, edited by E. D. Dana.

SERIES IV. Vols. 1 to date; also, whole number 151 to date, 1896 to date. Vols. 1 to 3, read also, whole number 151 to 154, or No. 1 to 18, 1896-1897.

The American Journal of Science and Arts.
See *The American Journal of Science.* (No. 5856.)

5857. **American Telegraph Magazine.** Monthly. 8vo.
New York, 1852–1853
Vol. 1, No. 6, July 1, 1853.

Only six numbers published. The first is dated Oct., 1852, and edited by Donald Mann. No. 1 contains an appendix of 16 pages entitled, "A Memorial from Henry O'Rielly, and accompanying documents, proposing a system of intercourse across the American continent by mail and telegraph, etc." No. 6 deals with a controversy between O'Rielly and the Associated Press. This number announces the merging of the journal with *Shaffner's Telegraph Companion* (No. 5954).

5858. **Annales de l'Électricité.** Recueil périodique parraissant le 15 et le 30 de chaque mois. 8vo. *Brussels, 1882–1884*
Vols. 1–3. Complete.

The first issue is dated Jan. 1, 1882, and the final issue, September 15, 1884.

5859. **Annales Télégraphiques.** Mémoires et documents relatifs à la télégraphie et à l'électricité. 8vo. *Paris, 1855–date*
Series I, Vols. 1 and 2, 1855–1856.—Series II, Vols. 1–8, 1858–1865.—Series III. Vols. 1–21, Vol. 22, Sept. and Oct., 1874–95. —Table générale, 1855–1890.
ANNALES TÉLÉGRAPHIQUES. Publiées sous la patronage du directeur général des lignes télégraphiques. Sous les auspices de l'administration des lignes télégraphiques. Vol. 1, July-Dec., 1855; Vol. 2, Jan.-Feb., 1856.—Publication was suspended from March, 1856-July, 1858.
ANNALES TÉLÉGRAPHIQUES. Publiées par un comité composé de fonctionnaires de l'administration des lignes télégraphiques. Series II, Vols. 1-8. Bi-monthly. July, 1858-Dec., 1865.—Publication was suspended from 1866-1874.
ANNALES TÉLÉGRAPHIQUES. Series III, vols. 1-date. Bi-monthly. 1874-date.
Table générale, 1855-1890. Paris, 1891. 8vo.

5860. **Annals of Electricity, Magnetism, and Chemistry;** and guardian of experimental science. Conducted by William Sturgeon, assisted by gentlemen eminent in the departments of philosophy. 8vo. *London, 1837–1843*
Vols. 1–10, Oct. 1836–June, 1843.
Published irregularly from 1836-July 1840, and monthly from August 1840-June 1843. The set is complete in 10 volumes and five additional numbers.

5861. **Annals of Philosophy.** Monthly. 8vo. *London, 1813–1826*
Vols. 1–16, and New Series, Vols. 1–12. Complete.
ANNALS OF PHILOSOPHY, or magazine of chemistry, mineralogy, mechanics, natural history, agriculture, and the arts. By Th. Thomson, Arthur Aiken, and John Bostoch. Vols. 1-16. London, 1813-1820. 8vo.—Vols. 11 and 12 were edited jointly by Thomson, Aiken and Bostoch, the other volumes being edited by Thomson alone.
ANNALS OF PHILOSOPHY. Edited by R. Phillips, E. W. Brayley. Vols. 17-28, or New series, Vols. 1-12. London, 1821-1826.—United in 1827 with the *Philosophical Magazine and Journal* (No. 5916).

5862. **Annals of Philosophy, Natural History, Chemistry, Literature, Agriculture, and the Mechanical and Fine Arts.** By T. Garnett and other gentlemen. 8vo. *London, 1801–1804*
Vols. 1–3. Complete.
The work has three subdivisions: Science, Arts and Literature. Vol. 1, 1801, edited by Dr. Garnett; Vol. 2, 1802, by C. and A. Aiken (Dr. Garnett, deceased); Vol. 3, 1804, editor not given.

5863. **L'Année Scientifique et Industrielle,** ou Exposé annuel des travaux scientifiques, des inventions et des principales applications de la science à l'industrie et aux arts qui ont attiré l'attention publique en France et à l'étranger. Par Louis Figuier. 12mo. *Paris, 1857–date*
Vol. 1. 1857; 19, 1876.
There is a general index of Vols. 1-10, and also of Vols. 1-20 (1857-1877).

5864. **Annual of Scientific Discovery:** or year-book of facts in science and arts, for [1850]–1871, exhibiting the most important discoveries and improvements in mechanics, useful arts, natural phi-

losophy, chemistry, astronomy, geology, biology, botany, mineralogy, meteorology, geography, antiquities, etc., together with notes on the progress of science; a list of recent scientific publications; obituaries of eminent scientific men, etc. 8vo.

Boston, 1850–1871

Year 1867.

Published yearly and complete in 21 vols. Edited, 1850-1865, by D. A. Wells, assisted from 1850-1851 by George Bliss, Jr.; 1866-1869, Samuel Kneeland; 1870-1871, John Trowbridge, assisted, 1870, by Samuel Kneeland and W. R. Nichols, and in 1871, by W. R. Nichols and C. R. Cross.

Continued as *Annual Record of Science and Industry.* Edited by S. F. Baird, assisted by eminent men of science. Annually. 1872-1879. 7 vols. New York, 1871-1878.

5865. **Arcana of Science and Art:** or annual register of useful inventions and improvements, discoveries and new facts, in mechanics, chemistry, natural history, and social economy; abridged from the transactions of public societies and from other scientific journals, British and foreign. 12mo.

London, 1828–1838

Year 10, 1837.

ARCANA OF SCIENCE AND ART; or one thousand popular inventions and improvements. Abridged from the transactions of public societies and from scientific journals, British and foreign. (Year 1), 1828.

ARCANA OF SCIENCE, and annual register of the useful arts. (Year 2), 1829.

ARCANA OF SCIENCE AND ART; or an annual register of popular inventions (later "useful inventions") and improvements, etc. Years 3-11, 1830-1838.

The mention of year is omitted on the title pages for 1828-1833; from 1834 on "Year 6," etc., appear, excepting the volume for 1838. Editor, John Timbs.

Superseded by *Year-book of Facts in Science and Arts* (No. 5965).

5866. Archives de l'Électricité, par M. A. de la Rive. 8vo.

Paris, 1841–1845

5 Vols. Complete.

Edited by Auguste Arthur de la Rive. Supplément to *La Bibliothèque Universelle de Genève.*

Tome I includes Nos. 1-3; tome II, Nos. 4-6; tome III, Nos. 7-12; tome IV, Nos. 13-16; tome V, Nos. 17-20.

5867. **The British Almanac of the Society for the Diffusion of Useful Knowledge.** Yearly. 12mo. *London, 1828–date*

Years 1843, 1848, 1853, 1858, 1867, 1883.

THE BRITISH ALMANAC. 1828. At head of title: Published under the superintendence of the Society for the Diffusion of Useful Knowledge.

THE BRITISH ALMANAC OF THE SOCIETY FOR THE DIFFUSION OF USEFUL KNOWLEDGE. 1829-1886.

THE BRITISH ALMANAC. 1887-1888.

THE BRITISH ALMANAC AND FAMILY CYCLOPAEDIA. 1897-date.

The publishers were as follows: 1828, Baldwin & Cradock; 1829-1854, C. Knight; 1855-1869, Knight & Co.; 1870-1883, Company of Stationers; 1884-1896, The Stationers' Company by C. Letts & Co.

From 1828 to 1888 each volume includes the *Companion to the Almanac;* or,

Year-book of General Information (No. 5873), with separate title-page and pagination. From 1840 on the title reads, "For the Year of Our Lord." 1844 has the note, "Being Bissextile, or Leap-year"; 1845-1847 are designated also, first, second and third year after the bissextile, the note appearing on the title-page until 1888. The year 1895 is designated 68th year, and following years are similarly numbered.

5868. **British Annual and Epitome of the Progress of Science.** Edited by Robert D. Thomson. 12mo. *London, 1737–1739*

Vols. 1–3. Complete.

5869. **British Association for the Advancement of Science.** Reports of the Meetings. 8vo. *London, 1833–date*

Vols. 1–8, 11–47, 1831–1838, 1841–1877. Vols. 70 and 71 have been added through gift of the New York Public Library.

Meetings: 1, York, 1831; 2, Oxford, 1832; 3, Cambridge, 1833; 4, Edinburgh, 1834; 5, Dublin, 1835; 6, Bristol, 1836; 7, Liverpool, 1837; 8, Newcastle, 1838; 9, Birmingham, 1839; 10, Glasgow, 1840; 11, Plymouth, 1841; 12, Manchester, 1842; 13, Cork, 1843; 14, York, 1844; 15, Cambridge, 1845; 16, Southampton, 1846; 17, Oxford, 1847; 18, Swansea, 1848; 19, Birmingham, 1849; 20, Edinburgh, 1850; 21, Ipswich, 1851; 22, Belfast, 1852; 23, Hull, 1853; 24, Liverpool, 1854; 25, Glasgow, 1855; 26, Cheltenham, 1856; 27, Dublin, 1857; 28, Leeds, 1858; 29, Aberdeen, 1859; 30, Oxford, 1860; 31, Manchester, 1861; 32, Cambridge, 1862; 33, Newcastle-upon-Tyne, 1863; 34, Bath, 1864; 35, Birmingham, 1865; 36, Nottingham, 1866; 37, Dundee, 1867; 38, Norwich, 1868; 39, Exeter, 1869; 40, Liverpool, 1870; 41, Edinburgh, 1871; 42, Brighton, 1872; 43, Bradford, 1873; 44, Belfast, 1874; 45, Bristol, 1875; 46, Glasgow, 1876; 47, Plymouth, 1877; 48, Dublin, 1878; 49, Sheffield, 1879; 50, Swansea, 1880; 51, York, 1881; 52, Southampton, 1882; 53, Southport, 1883; 54, Montreal, 1884; 55, Aberdeen, 1885; 56, Birmingham, 1886; 57, Manchester, 1887; 58, Bath, 1888; 59, Newcastle-upon-Tyne, 1889; 60, Leeds, 1890; 61, Cardiff, 1891; 62, Edinburgh, 1892; 63, Nottingham, 1893; 64, Oxford, 1894; 65, Ipswich, 1895; 66, Liverpool, 1896; 67, Toronto, 1897; 68, Bristol, 1898; 69, Dover, 1899; 70, Bradford, 1900; 71, Glasgow, 1901; 72, Belfast, 1902; 73, Southport, 1903; 74, Cambridge, 1904; 75, South Africa, 1905; 76, York, 1906; 77, Leicester, 1907; 78, Dublin, 1908.
General index, 1831-1860. London, 1864.

5870. **British Spiritual Telegraph,** being a weekly record (monthly from Vol. 2) of spiritual phenomena. 8vo.

Keighley and London, 1857–1859

Vols. 1, 2.

The publication is complete in 3 vols., June 27, 1857-May 15, 1859, and a supplement consisting of a series of essays by J. Ashburner. Monthly from Oct., 1857-Sept., 1858. Vol. 1 published at Keighley; Vols. 2 and 3 at London.

Bulletin de la Compagnie Internationale des Téléphones.

5871. **Bulletin International de l'Électricité.** Folio and 4to.

Paris, 1882–1895

Years 1–3, 1882–1884.

BULLETIN DE LA COMPAGNIE INTERNATIONALE DES TÉLÉPHONES. 3 years. Folio. Paris, 1882-1885. Year 1, Oct., 1882-Jan. 2, 1883; Year 2, Jan. 8, 1883-Dec.31, 1883; Year 3, Jan. 7, 1884-Dec. 29, 1884.

BULLETIN INTERNATIONAL DES TÉLÉPHONES. 1 vol. Folio. Paris, 1886.

BULLETIN INTERNATIONAL DE L'ÉLECTRICITÉ. Vols. 1-9. 4to. Paris, 1887-1895.

5872. **Bullettino Telegrafico del Regno d'Italia.** Monthly. Sm. 4to. *Turin (later Florence and Rome), 1865–1888*
Years 15, 17–21. 1879, 1881–1885.
The publication is complete in 14 vols., 1865-1888.

5873. **Companion to the Almanac; or, Year-Book of General Information.** Yearly. 12mo. *London, 1828–1888*
Years 1 to 42, 1828–1869, and Index to 1828–1843, London, 1843.
Complete in 61 years, and issued as a supplement to the *British Almanac* (No. 5868). Volume for 1849 called 19th year, and similarly up to 1888 (61st year). From 1889-1896 the *Companion* was published with the Almanac, with the title *British Almanac and Companion.*

5874. **Centralblatt fuer Elektrotechnik.** Erste deutsche Zeitschrift fuer angewandte Elektricitaetslehre. Herausgegeben von F. Uppenborn, Jr. Large 8vo. *Muenchen, 1880–1889*
Vols. 1–7, 1880–1885.
ZEITSCHRIFT FUER ANGEWANDTE ELEKTRICITAETSLEHRE mit besonderer Beruecksichtigung der Telegraphie, des elektrischen Beleuchtungswesen, der Galvanoplastik und verwandter Zweige. Vols. 1-4.—Vol. 1 complete in 12 numbers; Vol. 2 in 22 numbers; Vol. 3 in 24 numbers; Vol. 4 in 30 numbers, two being double numbers. Vols. 1 and 2 were edited by Ph. Carl; Vols. 3 and 4 by F. Uppenborn, Jr.
CENTRALBLATT FUER ELEKTROTECHNIK. Vols. 5-12, 1883-1889; Vols. 5-10 were published in 36 numbers; Vol. 11 contains 18 and Vol. 12 26 numbers.—Vols. 5-10 are also designated as Years 5-10; Vols. 11 and 12 as Year 11, Parts I and II. In 1890 the journal was incorporated with *Electrotechnische Zeitschrift* (No. 5896).

5875. **Civil Engineer and Architects' Journal.** Monthly. 4to. *London, 1837–1868*
Vols. 1–20, 1837–1857.
CIVIL ENGINEER AND ARCHITECTS' JOURNAL. Vol. 1, Oct, 1837-Dec., 1838.
CIVIL ENGINEER AND ARCHITECTS' JOURNAL, SCIENTIFIC AND RAILWAY GAZETTE. Vols. 2-13, (1839-1850).
CIVIL ENGINEER AND ARCHITECTS' JOURNAL, incorporated with the *Architect.* Vols. 14-19, 1851-1856.
CIVIL ENGINEER AND ARCHITECTS' JOURNAL. Vols. 20-31, 1857-1868.—Complete in 31 volumes.

Deutsch-Oesterreichischer Telegraphen-Verein. Zeitschrift.
See *Zeitschrift des Deutsch-Oesterreichischen Telegraphen-Vereins.* (No. 5966.)

5876. **Dublin Quarterly Journal of Science.** Containing papers, read before the Royal Dublin Society, the Royal Irish Academy, the Geological Society of Dublin and the Natural History Society of Dublin. 8vo. *Dublin and London, 1861–1866*
Vols. 1–3, 1861–1863.
Complete in 6 vols. Edited by Samuel Haughton.

5877. **Edinburgh Journal of Science.** Exhibiting a view of the progress of discovery in natural philosophy, chemistry, mineralogy, geology, practical mechanics, telegraphy, fine and useful arts. Edited by D. Brewster. 8vo. *Edinburgh, 1824–1832*

Vols. 1–10, 1824–1829. New series, Vols. 1–6 [11–16], 1829–1832.

Title changed in new series by dropping the subtitle. Published in London, Edinburgh and Dublin.—United in 1832 with the *Philosophical Magazine* or *Annals* to form the *London and Edinburgh Philosophical Magazine* (No. 5916).

5878. **Electric Light.** Journal of electrical lighting, and record of inventions, improvements, current events in connection with this branch of scientific industry. Monthly. Folio.

London, 1882–1883

Vol. 1, May, 1882–April, 1883. Complete.

Incorporated with *The Electrical Engineer,* London, in 1883 (No. 5880).

5879. **Electric Telegraph and Railway Review.** Edited by T. E. Lundy. Weekly. 4to. *London, 1870*

Vols. 1, 2, Jan. 15, 1870–Nov. 19, 1870. Complete.

ELECTRIC TELEGRAPH REVIEW. Vol. 1, Nos. 1-5, Jan. 15, 1870-Feb. 12, 1870.

ELECTRIC TELEGRAPH AND RAILWAY REVIEW. Vol. 1, Nos. 6-26, Feb. 19, 1870-July 9, 1870; Vol. 2, Nos. 27-45, July 16, 1870-Nov. 19, 1870.

5880. **The Electrical Engineer.** A weekly journal of electrical engineering, with which is incorporated *Electric Light.* Folio.

London, 1882–date

Vols. 1–6 and New Series Vols. 1–14, 1882–1894. Now complete to date by additions from Library file.

ELECTRICAL ENGINEER. A journal of electrical engineering with which is incorporated *Electric Light* (No. 5878). Monthly. Vols. 2-6, May, 1883-Dec., 1887.—A weekly journal. New Series. Vols. 1-date. (From Vol. 10 on also "Old Series" 16-date).

5881. **The Electrical Engineer.** A weekly review of theoretical and applied electricity. 4to. *New York, 1882–1899*

Vols. 1–8, 1882–1889. Now complete by additions from Library file.

THE ELECTRICIAN. A monthly journal devoted to the advancement and diffusion of electrical science. Vols. 1, 2, Jan., 1882-Dec., 1883.

THE ELECTRICIAN AND ELECTRICAL ENGINEER. A monthly review of theoretical and applied science. Vols. 3-6, Jan., 1884-Dec., 1887. F. L. Pope, editor.

THE ELECTRICAL ENGINEER. A monthly review of theoretical and applied science. Vols. 7-9, Jan., 1888-March, 1890. F. L. Pope and G. M. Phelps, Jr., editors. — — A weekly review of theoretical and applied science. Vols. 10-27, April 2, 1890-March 2, 1899. T. C. Martin and Joseph Wetzler, editors.

Incorporated with the *Electrical World,* March 11, 1899, the combined journal taking the name *Electrical World and Electrical Engineer* (No. 5887).

5882†. **Electrical Industries.** An illustrated monthly journal devoted to practical electricity. Monthly. Folio. *Chicago, 1889–1896*

Vols. 1–7. Complete.

ELECTRICAL INDUSTRIES. A monthly journal devoted to the consideration and advancement of electricity in all its applications. Vol. 1 is complete in 13 numbers, Dec., 1889-Dec., 1890. A supplement was issued in 1893, entitled *Weekly World's Fair:* Devoted to the electrical and allied

interests of the World's Fair, its visitors and exhibitors; Vol. 1, Nos. 1-21, June 15, 1893-Nov. 2, 1893. Vol. 7 has only 4 numbers, Jan.-April, 1896. Title-pages and indexes were not issued to Vols. 1, 2 and 7. Sub-title was changed to that of main entry with No. 10, Vol. 6.

The earlier volumes contain a directory of central stations and electric railways which later was issued as a separate publication with the title *Electrical Industries Directory*, changed to *Central Station List*, and now (1908) known as *The McGraw Electrical Directory*. In 1897 the *Central Station List* absorbed *Johnston's Electrical and Street Railway Directory*, which in 1893 succeeded *Whipple's Electrical Directory*, the first issue of which appeared in 1889.

Succeeded, May, 1896, by *American Electrician* (No. 5855).

5883. **Electrical Magazine.** Conducted by Ch. V. Walker. 8vo. *London, 1843–1847*

Vols, 1, 2, July, 1843–Oct., 1846. Complete.

5884. **Electrical News and Telegraphical Reporter.** Edited by Wm. Crookes. 4to. *London, 1875*

Vol. 1, July 1–Oct. 7, weekly and Oct. 14–Dec. 15, semi-monthly. 1875. Complete.

5885. **Electrical Review.** Large 8vo. and 4to. *London, 1872–date*

Vols. 1–41, 1872–1897. Now complete by additions from Library file.

TELEGRAPHIC JOURNAL AND MONTHLY ILLUSTRATED REVIEW OF ELECTRICAL SCIENCE. Vol. 1, Nos. 1, 2, Nov. 15-Dec. 15, 1872. Large 8vo.

TELEGRAPHIC JOURNAL AND ELECTRICAL REVIEW. Monthly. Vol. 1, Nos. 3-7, Jan., 1873-May, 1873. Semi-monthly. Vol. 1, Nos. 8-end and Vols. 2-9, June 1, 1873-Dec. 15, 1881. Large 8vo. Weekly. Vols. 10-29, Jan 7, 1882-Dec. 25, 1891. 4to.

ELECTRICAL REVIEW. Weekly. Vols. 30-date, Jan. 1, 1892-date. 4to. Photographs are pasted in a space reserved on the first page of a number of issues of Vols. 4-6 and 8, the subjects being Wheatstone, Latimer Clark, Sir William Thomson, Faraday, Charles W. Siemens, Werner Siemens, Prof. David E. Hughes and James Clerk Maxwell; a biographical sketch accompanies each photograph.

5886. **Electrical Review and Western Electrician.** 4to and folio. *New York, Chicago, 1882-date*

Vols. 1–6, 1882–1885. Now complete by additions from Library file.

NEW YORK REVIEW OF THE TELEGRAPH AND TELEPHONE AND ELECTRICAL JOURNAL. Semi-monthly. Vol. 1, Nos. 1-8, Feb. 15, 1882-June 1, 1882. 4to.

REVIEW OF THE TELEGRAPH AND TELEPHONE. A journal of electrical, scientific and mechanical news. Semi-monthly. Vol. 1, Nos. 9-end and vol. 2, Nos. 1 and 2, June 15, 1882-March 1, 1883. Folio.

ELECTRICAL REVIEW. A weekly journal of electric light, telephone, telegraph and scientific progress. Vol. 2, Nos. 3-end and vols. 3-21, March 22, 1883-Feb. 18, 1893. Folio.

ILLUSTRATED ELECTRICAL REVIEW. A journal of scientific and electrical progress. Weekly. Vols. 22-31, Feb. 25, 1893-Dec. 29, 1897. Folio.

ELECTRICAL REVIEW. An illustrated weekly journal of scientific and electrical progress. Vols. 32-35, Jan. 5, 1898-Dec. 27, 1899. 4to.

ELECTRICAL REVIEW. The pioneer electrical weekly of America. Vol. 36-vol. 53, No. 18, Oct. 30, 1908. 4to.
ELECTRICAL REVIEW AND WESTERN ELECTRICIAN. Chicago. 4to. Consolidation of *Electrical Review* and *Western Electrician.* Continues volume and page numbering of *Electrical Review.* First issue dated Nov. 7, 1908, Vol. 53, No. 19. The *Western Electrician,* weekly, was founded in Chicago, January, 1887. The last issue is Oct. 30, Vol. 43, No. 18.

5887. The Electrical World. Weekly. 4to. *New York, 1874–date*
Vols. 1, 3–15, 1883–1890. Now complete to date by gift of *Electrical World* and additions from Library file.
Founded as *Operator,* 1874 (No. 5933).
THE OPERATOR AND ELECTRICAL WORLD. A journal for telegraphists, telephonists, electricians and electrical engineers. Weekly. Vol. 1, Nos. 1-16, Jan. 6, 1883-April 21, 1883.
ELECTRICAL WORLD. A weekly review of current progress in electricity and its practical applications. Vol. 1, Nos. 17-end, and Vols. 2-33, April 28, 1883-March 4, 1899. A General Index (8vo) was published in 1897, covering the years 1883-1896.
THE ELECTRICAL WORLD AND ENGINEER. A weekly review of current progress in electricity and its practical applications. Vols. 33-46, March 11, 1899-Dec. 30, 1905.—Consolidation of *Electrical World* and *Electrical Engineer.*
ELECTRICAL WORLD. A review of current progress in electricity and its practical applications. Vols. 47-date, Jan. 6, 1906-date. Consolidation of *Electrical World and Engineer* and *American Electrician.*
ELECTRICAL WORLD. Monthly edition, with separate index, Jan. 1906-date. The monthly edition and the first issue of the month of the weekly edition differ in some of the small type matter of the final reading pages and in the pagination.

5888. The Electrician. A weekly journal of telegraphy and general applied science. 4to. *London, 1861–1864*
Vols. 1–6, or Nos. 1–134. Complete.
THE ELECTRICIAN. A weekly journal of telegraphy, electricity and applied chemistry. Vols. 1-4, Nov. 9, 1861-Oct. 23, 1863.
THE ELECTRICIAN. A weekly journal of telegraphy and general applied science. Vols. 5 and 6. Vol. 6 consists of only 5 numbers.
Publication was resumed in 1878 with the same title.

5889. The Electrician. The oldest weekly illustrated journal of electrical engineering, industry, science and finance. 4to. *London, 1878–date*
Vols. 1–35, 38, 39, 1878–1895, 1896–1897. Now complete by additions from Library file.
THE ELECTRICIAN. A weekly journal of theoretical and applied electricity and chemical physics. Vols. 1-19, May 25, 1878-Nov. 4, 1887 including two specimen numbers of March, 1878.—A weekly illustrated journal of electrical science, industry and engineering. Vol. 20, Nov. 11, 1887-May 4, 1888.—A weekly illustrated journal of electrical engineering, industry and science. Vols. 21-50, May 11, 1888-June 12, 1903.—The oldest weekly illustrated journal of electrical engineering, industry, science and finance. Vols. 51-date, June 19, 1903-date.
Vols. 35-40 have added to sub-title: Established 1861-1878; Vols. 41 and 42, established, first series, 1861; Vols. 43-date, second series, 1878. Established (weekly) first series, 1861; second series (weekly), 1878.

For so-called first series of *The Electrician*, see No. 5888.

The Electrician.—*The Electrician and Electrical Engineer.* See *The Electrical Engineer, New York.* (No. 5881.)

5890. **L'Électricien.** Revue internationale de l'électricité et de ses applications. L. 8vo. *Paris, 1881–date*

Vols, 1–9, 1881–1885. Now complete to date, except Vols. 10–14, 1886–1890, by additions from Library file.

L'ÉLECTRICIEN. Revue générale d'électricité. Semi-monthly. Vols. 1-8, April, 1881-Dec. 15, 1884. Weekly. Vols. 9-14, Jan., 1885-Dec., 1890. L. 8vo. United in Jan., 1891, with *Revue internationale de l'électricité et de ses applications* (No. 5944).

L'ÉLECTRICIEN. Revue internationale de l'électricité et de ses applications. Second series. Weekly. Vols. 1-date, Jan., 1891-date.

5891. **L'Électricité.** Revue scientifique illustrée. Organe officiel de l'exposition internationale de l'électricité en 1877 au Palais de l'Industrie à Paris. Directeur, Armengaud jeune. 4to. *Paris, 1876–1894*

Vols. 1–9, 1876–1885.

L'ÉLECTRICITÉ. Revue scientifique illustrée. Beaux-arts, industrie, marine, art militaire, médecine. Vol. 1. Bi-monthly, Jan. 15, 1876-Août, 1876. Vols. 2, 3, semi-monthly, Juillet 5, 1878-Dec. 20, 1880. Vol. 4, weekly, Jan. 8, 1881-Dec. 31, 1881.—No issues between Août, 1876-Juillet, 1878.

L'ÉLECTRICITÉ. Journal scientifique illustré. Vol. 5, Nos. 1-44, Jan. 7, 1882-Nov. 4, 1882.

L'ÉLECTRICITÉ. Revue scientifique illustrée. Vol. 5, No. 45-end. Vol. 6, Nov. 11 to Vol. 17, 1882-1894.

Vols. 1-18 are also called years 1-18.

5892. **Electricity.** Journal edited by the Russian Technical Society, [in Russian language]. 4to. *St. Petersburg, 1880–1891*

Vols. 1–3, 1880–1883.

The publication is complete in 12 vols., 1880-1891.

5893. **Electricity and Electrical Engineering.** Weekly. 4to. *London, 1890–date*

Vols. 1–5, 1890–1893. Now complete by additions from Library file.

Founded in 1890 by the late Julius Maier. Acquired in 1894 by Mr. Sidney Rentell and since conducted by him.

5894. **Electro-Metallurgist and Electric Light Journal.** Edited by A. Watt. Monthly, 4to. *London, 1880– ?*

Vol. 1, Nos. 1–6.

5895. **Der Elektrotechniker.** Aeltestes Oesterreichisch-Ungarisches Fachblatt fuer Elektrotechnik. Zeitschrift fuer angewandte Elektrizitaet mit besonderer Ruecksichtnahme auf Telegraphie, Telephonie, elektrische Beleuchtung, Kraftuebertragung und verwandte Zweige. Herausgegeben von Filipp Froehlich und Otto Froehlich. Semi-monthly. 4to. *Vienna, 1882–date*

Vols. 1–4, 1882–1886.

DER ELECTRO-TECHNIKER. Organ fuer angewandte Electricitaet. Vols. 1, 2, 1882-1884.

DER ELECTRO-TECHNIKER. Erstes oesterreichisch-ungarisches Fachblatt. Organ fuer angewandte Electricitaet, etc. Herausgegeben von G. Ad. Ungar-Szentmiklosy. Vols. 3-date.

Sub-title changes from Vol. 22 on to: Officielles Organ der Genossenschaft der konzessierten Elektrotechniker in Niederoesterreich.

Vols. 26-date title reads: *Elektrotechniker.* Aeltestes Oesterreichisch-ungarisches Fachblatt, etc.

5896. **Elektrotechnische Zeitschrift..** Monthly, semi-monthly and weekly. 8vo. and 4to. *Berlin, 1880–date*

Vols. 1–9, 1880–1888. Now complete by additions from Library file.

ELEKTROTECHNISCHE ZEITSCHRIFT. Monthly. Vols. 1-8, Jan., 1880-Dec., 1887. Semi-monthly, vols. 9 and 10, Jan., 1888-Dec., 1889. Large 8vo. —Centralblatt fuer Elektrotechnik. Organ des Elektrotechnischen Vereins. Redigiert von Gisbert Kapp und Jul. H. West. Weekly. Vols. 11-14, 1890-1893. Folio.—Centralblatt fuer Elektrotechnik. Organ des Elektrotechnischen Vereins und des Verbandes Deutscher Elektrotechniker. Weekly. Vols. 15-date, 1894-date. Folio.—Organ des Elektrotechnischen Vereins, 1880-June, 1894; organ des Elektrotechnischen Vereins und des Verbandes Deutscher Elektrotechniker, July, 1894-date.

Editors: 1880-1882, K. E. Zetzsche; 1883-1884, K. E. Zetzsche, A. Slaby; 1885-1886, K. E. Zetzsche, R. Ruehlmann; 1887-1888, R. Ruehlmann, G. Wabner; 1889, R. Ruehlmann, R. Petsch· 1890-Sept., 1894, F. Uppenborn; Oct., 1894-June, 1900, G. Kapp, J. H. West; July, 1900-June, 1905, G. Kapp; July, 1905-date, E. C. Zehme.

L'Elettricita.

See La Natura. (No. 5928.)

5897. **The Engineer.** Weekly. Folio. *London, 1856–date.*

Vols. 1–18, 23–44, 52–68, 1856–1864, 1867–1877, 1881--1889. Now complete to date, except vols. 19–22, by additions from Library file.

Separate publications: Illustrated record of British Patents; being an abstract of specifications together with notes of patent cases. The whole reprinted from "The Engineer," Jan.-June, 1881. 2 vols. London, 1881. Folio. —Portfolio of working drawings. Supplement to "The Engineer." Nos. 1-126. New Series, Nos. 1-date. London, 1868-date. Folio.—Standard locomotives. Planes. Issued as supplement to "The Engineer." London, 1888-1891. Folio.

5898. **Engineer's Journal and Railway and Public Works Chronicle of India and the Colonies.** 4to. *Calcutta, 1858–1869*

Vol. 1 (semi-monthly), 1858.

The publication is complete in 12 vols., 1858-1869.

5899. **Engineering.** An illustrated weekly journal, conducted by William H. Maw and James Dredge. Weekly. Folio.

London, 1866–date

Vols. 21–36, 1876–1883. Now complete, except Vols. 1, 2, 5, 9, 12, by additions from Library file.

Conducted by Zerah Colburn, 1866-1869; by William H. Maw and James Dredge, from 1870 to the death of the latter, August 15, 1906, who was succeeded by B. Alfred Raworth as joint editor.

A German edition was published under the title: *Engineering.* Deutsche Ausgabe der gleichnamigen technischen Wochenausgabe von W. H. Maw and J. Dredge in London, vermehrt durch deutsche original Artikel. He-

rausgegeben von Jos. von Stummer-Traunfels. Year 1 or Vols. 1, 2, 1874.—Continued as Stummer's Ingenieur. Internationales Organ fuer das Gesammtgebiet des technischen Wissens, etc. Herausgegeben von Jos. von Stummer-Traunfels. Years 2-4 or Vols. 3-8, 1875-1877. Wien, 1874-1877. Folio. [No more published.]

5900. **The English Mechanic and World of Science.** Weekly. 4to. *London, 1865–date*

Vols. 23–55, 1876–1892. Now complete, excepting a few issues, by additions from Library file.

THE ENGLISH MECHANIC. A record of mechanical invention, scientific and industrial progress, applied chemistry, arts, manufactures, engineering, building, etc. Vols. 1, 2, March 31, 1865-Sept., 1865.

THE ENGLISH MECHANIC AND MIRROR OF SCIENCE AND ART. A record of engineering, building, etc. Vols. 3-11, Sept. 29, 1865-March 18, 1870.—Consolidation of the *English Mechanic and Mirror of Science and Art*, the *Mechanic, Scientific Opinion* and *British and Foreign Mechanic and Scientific Instructor.*

THE ENGLISH MECHANIC AND MIRROR OF SCIENCE AND ART. With which are incorporated the *Mechanic, Scientific Opinion* and the *British and Foreign Mechanic.* Vols. 12-date, March 25, 1870-date.

5901. **Glasgow Mechanics' Magazine and Annals of Philosophy.** Weekly. 8vo. *Glasgow, 1824–1826*

Vols. 1–5, Jan. 3, 1824–Sept. 16, 1826. Complete.

5902. **Greenwich (England). Royal Observatory.—Results of the Magnetical and Meteorological Observations,** made at the Royal Observatory at Greenwich. Yearly. 4to. *London, 1842–date*

Years 1880–1895. (1882–1897.)

5903. **India Rubber and Gutta Percha and Electrical Trades' Journal.** A monthly [later weekly] record of the Caoutchouc, Gutta Percha, Asbestos, and allied industries. 4to. *London, 1884–date*

Vol. 1, Nos. 6–12. Vol. 2, Nos. 1–8. August, 1884–March, 1886.

In 1895 an index was published to vols. 1-10, 1884-1894.

5904. **The Indian Telegraphic Journal.** Bi-monthly. L. 8vo. *London, 1875– ?*

Vols. 2, Part 2, 1876.

5905. **L'Ingénieur Électricien.** Revue des progrès de l'électricité industrielle dans tous les pays du monde, journal, bi-mensuel paraissant le 5 et 20 de chaque mois. 4to. *Paris and Brussels, 1861–date*

Vol. 1, semi-monthly, Aug. 5, 1886–Sept. 25, 1886. Weekly Oct. 16,–date.

First series is complete in 1 vol. No issues for 1887. From 1888 published as Deuxième Série.

5906. **L'Institut.** Journal des sciences et des sociétés savantes en France et à l'étranger. (Le propriétaire redacteur: E. Arnoult.) 4to. *Paris, 1833–1876*

Vols. 3–7, 1835–1839.

L'INSTITUT. Journal des académies et sociétés scientifiques de la France

et de l'étranger. 1 vol. Paris, 1833.—Journal général [later universel] des sociétés et traveaux scientifiques. 2 vols. [2-3] Paris, 1834-1835.—Journal général des sociétés et traveaux scientifiques de la France et de l'étranger. Premier section. Sciences mathématiques, physiques et naturelles. 36 vols. [4-40] Paris, 1837-1872.—Journal des sciences et des sociétés savantes en France et à l'étranger. Premier section. 4 vols. [41-44.] Paris, 1873-1876. No more published.

5907. **Institution of Civil Engineers, London.** Minutes of Proceedings of the Institution of Civil Engineers; with other selected and abstracted papers. 8vo. *London, 1837–date*

Vols. 9, 19–105, 1850, 1861–1894. Now complete to date, except Vols. 1–8, 10–18, by additions from Library file, together with following indexes: General Index, Vols. 1–20, 1837–1861. Name Index, Vols. 1–58, 1837–1879. Subject Index, Vols. 1–154, 4 vols., 1837–1903.

In Vols. 4-38 the sub-title reads: With abstracts of the discussions.

General index to Vols. 1-20, Sessions, 1837-1860/61. London, 1865. General index to Vols. 21-30, Sessions, 1861/62-1869/70. London, 1871. Name Index to Vols. 1-58, Sessions, 1837-1878/79. London, 1885. (This index includes index to the Transactions, Vols. 1-3.)

Subject index to vols. 1-154, 1837-1903, 4 vols. London. (Includes index to the Transactions, Vols. 1-3). Brief subject index to Vols. 59-150.

Supplement to Vol. 154: Engineering conference, 1903. Edited by J. H. T. Tudsbery. London, 1903.

Separately printed from the Minutes of Proceedings of the Institution: Abstracts of papers in foreign transactions, forming section III in each volume from 39-126, 1874/75-1895/96. Editor, James Forrest.

Separately printed from the Minutes of Proceedings: Transactions of the Institution of Civil Engineers. Vols. 1-3. London, J. Weale, 1836-1842. (Vol. 3 published by the Institution.) A list of members is in each volume. Index to Vols. 1-3 in Vol. 3. (No more published.)

Editors: 1837-1841, T. Webster and C. Manby; 1842-1858, C. Manby; 1858-1862, C. Manby and J. Forrest; 1862-1895/96, J. Forrest; 1896-date, J. H. Tudsbery.

The Institution of Civil Engineers was established in 1818, and incorporated by Royal charter in 1828.

5908. **Institution of Electrical Engineers, Journal.** 8vo.

London, 1872–date.

Vols. 1–19, 1872–1890. Now complete by additions from Library file.

SOCIETY OF TELEGRAPH ENGINEERS' JOURNAL. Vols. 1-9. 1872-1880.

SOCIETY OF TELEGRAPH ENGINEERS AND OF ELECTRICIANS, JOURNAL. Vols. 10-17, 1881-1888.

INSTITUTION OF ELECTRICAL ENGINEERS, JOURNAL. Vols. 18-date. 1889-date.

General Index to vols. 1-10, 1872-1882; vols. 11-20, 1882-1891; vols. 21-30, 1892-1901.

Editors: Vols. 1-3, Frank Bolton and Geo. E. Preece; vol. 4, Frank Bolton and J. Sivewright; vols. 5-6, Frank Bolton and William Ed. W. Langdon; vols. 7-14, W. E. Ayrton; vols. 15-26, F. H. Webb; vols. 27-32, W. G. McMillan; vols. 33-date, G. C. Lloyd . . . . General Index to vols. 1-10 compiled by Alfred J. Frost; to vols. 11-20 by F. H. Webb, and to vols. 21-30 by W. G. McMillan.

The Institution was founded in 1871 as the Society of Telegraph Engineers;

name changed in 1881 to Society of Telegraph Engineers and Electricians; incorporated in 1883; name changed to present form in 1889. In 1899 the Northern Society of Electrical Engineers became the Manchester local branch of the Institution.

5909. **Internationale Elektrotechnische Zeitschrift und Bericht ueber die Elektrische Austellung.** Wochenschrift fuer die Gesammt-Interessen der Internationalen Elektrotechnischen Austellung, 1883. Redigiert von J. Kraemer und Ernst Lecher. Weekly. 4to. *Vienna, 1884*

Complete, in 24 numbers from July 15, 1883–Dec. 23, 1883.

5910. **Italy.—Direzione Generale dei Telegrafi.—Relazione Statistica sui Telegrafi del Regno d'Italia.** Yearly. 4to.

Turin, Florence and Rome, 1865–1888

For 1872–1888. (1873–1889.)

STATISTICA DEI TELEGRAFI del regno d'Italia. 1864. Turin, 1865.

RELAZIONE STATISTICA sui telegrafi del regno d'Italia nel bienno. 1865-1870. Florence, 1866-1871.

MINISTERO DEI LAVORI PUBBLICI. Direzione statistica dei telegrafi. Relazione statistica sull' esercizio dell anno 1871. Rome, 1872.

RELAZIONE STATISTICA sui telegrafi del regno d'Italia nel bienno 1872-1888.

The year 1873 bears as imprint, Florence and Rome; 1874-1876 Florence alone; 1877-1880 Florence and Rome; 1881-1888 Rome alone.

5911. **Italy.—Ministero Delle Poste e dei Telegrafi.—Relazione Statistica** interno ai servizi postale e telegrafico per esercizio 1889/90–1898/99. 4to. *Rome, 1891–1901*

For 1887–89; 1892–98.

PRIMA RELAZIONE STATISTICA riguardante. I. Il servizio postale 1887-1888 e 1888-1889. II. Il servizio delle casse postale di risparmio 1888. III. Il servizio telegrafico. 1888-1889. IV. Appendix. Rome, 1890. 4to.

RELAZIONE STATISTICA intorno ai servizi postale e telegrafico per esercizio 1889/1890-1898/1899 ed al servizio delle casse postali di risparmio per l'anno 1889-1898. Con appendice. 4to. Rome, 1891-1901.

5912. **Journal of Natural Philosophy, Chemistry and the Arts.** Illustrated with engravings. By William Nicholson. Monthly. 4to and 8vo. *London, 1797–1813*

Vols. 1, 2 and Series II, Vols. 1–36, 1797–1799; 1802–1813. Now complete by additions from Library file.

The first series comprises 5 vols. Vol. 1, 1797; 2, 1799; 3, 1800; 4, 1801; 5, 1802. Edited by W. Nicholson.—In 1803 the quarto edition was succeeded by an octavo publication with the title *Nicholson's Journal of Natural Philosophy, Chemistry and the Arts.* Illustrated with engravings. Vols. 1, 2, 1802; 3, 4, 1802; 5 and 6, 1803; 7-10, 1804; 11 and 12, 1805; 13-16, 1806; 17 and 18, 1807; 19-22, 1808; 23 and 24, 1809; 25-28, 1810; 29 and 30, 1811; 31-34, 1812; 35 and 36, 1813.

United in 1814 with the *Philosophical Magazine* (No. 5916).

Journal of Science and the Arts.

See *Royal Institution of Great Britain, Journal.* (No. 5946.)

5913. **Journal of the Telegraph.** 4to. *New York, 1868–date*
Vols. 8–23, 1875–1890. Now complete to date by additions from Library file.
JOURNAL OF THE TELEGRAPH. A semi-monthly [afterward monthly] record of the progress of the telegraph and of the electrical science. Semi-monthly, Vols. 1-15, Dec. 2, 1867-March 1, 1882. Monthly, Vol. 15 from March 20-Dec. 20, 1882. The earlier numbers were of newspaper size.
JOURNAL OF THE TELEGRAPH. Monthly. Vols. 16-date. 1883-date.
In 1877 absorbed *The Telegrapher* (No. 5960).
Numbers of Vol. 1, Dec. 1867-Nov. 8, 1868 are paged separately. Vols. 1-4 published by James D. Reid; Vols. 5-date by Western Union Telegraph Company.

5914. **Journal Télégraphique.** Publié par le Bureau International des Administrations Télégraphiques. Monthly. 4to.
Berne, 1869–date
Vols. 1–11, 1869–1887. Now complete to date, except Vols. 12–25, by additions from Library file.
Published by Le Bureau International des Administrations Télégraphiques.
Vol. 1 is complete in 26 Nos., Nov. 25, 1869-Dec. 25, 1871. Vols. 2-4 have 36 Nos. per year. (Vol. 2, Jan. 25, 1872-Dec. 25, 1874; Vol. 3, Jan. 25, 1875-Dec. 25, 1877; Vol. 4, Jan. 25, 1878-Dec. 25, 1880.) Vol. 5 or année 13, 1881-date, published monthly. Vol. 12, année 21, has a supplement: Nomenclature des câbles formant le reseau sous-marin du globe.

5915. **Knowledge.** Weekly and monthly. 4to. *London, 1882–date*
Vol. 1, 1881–1882.
KNOWLEDGE. An illustrated magazine of science, plainly worded—exactly described. Conducted by Richard A. Proctor. Vols. 1 to 8, 1881-1885. Weekly. Vol. 1, Nov., 1881-June, 1882; Vols. 2 to 7, July, 1882 to July, 1885; Vol. 8, July, 1885 to Oct., 1885.—An illustrated magazine of science, literature and art. Conducted by Richard A. Proctor. Vols. 9-11 or New Series, Vols. 1 to 3, Nov., 1885-Oct., 1888. Monthly.—An illustrated magazine of science. Simply worded—exactly described. Edited by A. Cowper Ranyard. Vols. 12 to 18. The sub-title "New Series" appears only up to Vol. 16, *i.e.*, Vols. 4 to 8, 1888-1895. [Vol. 12, Nov., 1888-Oct., 1889. Vol. 13, Nov., 1889-Dec., 1890. Vols. 14 to 18, Jan., 1891-1895.] From Vol. 16 on the name of author is omitted from title-page.
SIMPLY WORDED—EXACTLY DESCRIBED. KNOWLEDGE. An illustrated magazine of science, literature and art. Vols. 19 to 26, 1896-1903. Vol. 27, Jan., 1904. Monthly. From Vol. 20, 1897 on the title reads "Founded by Richard A. Proctor;" also from Vol. 25, 1902, on again New Series, 17; of Vol. 27, only one number has been published.
SIMPLY WORDED—EXACTLY DESCRIBED. KNOWLEDGE AND ILLUSTRATED SCIENTIFIC NEWS. Conducted by Major B. Baden-Powell and E. S. Grew, M.A. Vols. 1 to date, Jan., 1904-date, or New Series. Vols. 1 to date. The first number of Vol. 1 was published in February; title-page reads January. Monthly.

5916. **London, Edinburgh and Dublin Philosophical Magazine and Journal of Science.** 8vo. *London, 1798–date*
Series I, Vols. 1–28, 43–51, 53–54, 56–60. Series II, 11 vols. (complete). Series III, vols. 1, 2, 16–18, 26–37. Series IV, Vols. 1–4, 37, 39, 43–50. Series V, Vols. 1–25, 27–35, 37, 38. 101 volumes have been added by purchase from Carnegie Fund. The collection is now complete to date by additions from

Library file except Series I, Vol. 67 and Series V, Vols. 36 and 46.

PHILOSOPHICAL MAGAZINE. Comprehending the various branches of science, the liberal and fine arts, agriculture, manufactures and commerce. By Alexander Tilloch. 42 vols. London, 1798-1813.
United in 1814 with the *Journal of Natural Philosophy* (No. 5912).

PHILOSOPHICAL MAGAZINE AND JOURNAL. Comprehending the various branches of science, the liberal and the fine arts, geology, agriculture, manufactures and commerce. By Alexander Tilloch. From June, 1822, by Alex. Tilloch and Rich. Taylor. 26 vols. (43-68). London, 1814-1826.
United in 1827 with the *Annals of Philosophy, or Magazine of Chemistry* (No. 5861).

PHILOSOPHICAL MAGAZINE; or, annals of chemistry, mathematics, astronomy, natural history and general science. New and united series of the *Philosophical Magazine and Annals of Philosophy.* By Rich. Taylor and Rich. Phillips. 11 vols. (1-11). London, 1827-1832.
General index to Vols. 1-11. London, 1835. 8vo.
United in 1832 with the *Edinburgh Journal of Science* (No. 5877).

LONDON AND EDINBURGH PHILOSOPHICAL MAGAZINE. Conducted by David Brewster, Rich. Taylor and Rich. Phillips. New and united series of the *Philosophical Magazine* (from Vol. 7). *Annals of Philosophy and Journal of Science.* (3rd series). 16 vols. (1-16), London, 1832-1840.
General index to Vols. 1-12. Third series. London, 1839. 8vo.

LONDON, EDINBURGH AND DUBLIN PHILOSOPHICAL MAGAZINE AND JOURNAL OF SCIENCE. Conducted by David Brewster, Rich. Taylor, Rich. Phillips, and Rob. Kane. New and united series of the *Philosophical Magazine, Annals of Philosophy* and *Journal of Science.* (3d series.) 21 vols. (17-37.) London, 1840-1850.

LONDON, EDINBURGH AND DUBLIN PHILOSOPHICAL MAGAZINE AND JOURNAL OF SCIENCE. Conducted by David Brewster, Rich. Taylor, Rich. Phillips, Rob. Kane and William Francis. Fourth series. 50 Vols. (1-50). London, 1851-1875.—Fifth series. Edited by Rob. Kane, William Thomson and William Francis; in 1890, Rob. Kane was replaced by G. Fr. Fitzgerald; in 1892, William Thomson's name appears as Lord Kelvin. 50 vols. (1-50). London, 1876-1900.—Sixth Series. Edited by Lord Kelvin, G. Fr. Fitzgerald and William Francis. In 1901 (July), G. Fr. Fitzgerald was replaced by John Joly. Vols. 1-date. London, 1901-date.

5917. **London Electrical Society. Proceedings.** For 1841–1843. Edited by Charles Vincent Walker. 8vo. *London, 1843*
Complete.

5918. **London Electrical Society. Transactions and Proceedings.** For the years 1837–1840. Edited by one of the Committee. 4to. Complete. *London, 1841*

London Journal of Arts and Sciences.
See *Newton's Journal.* (No. 5932.)

The London Mechanics' Register.
See *New London Mechanics' Register.* (No. 5931.)

5919. **La Lumière Électrique.** Journal universel d'électricité. Applications de l'électricité, lumière électrique, télégraphie et téléphone, science électrique, etc. 4to. *Paris, 1879–1894; 1908–date*
Vols. 1–18, 1879–1885. Now complete by additions from Library file.
Complete in 53 vols. Published monthly from April 15, 1879-Sept. 15, 1879;

semi-monthly, Oct. 1, 1879-Dec. 15 1880; weekly, Jan. 1, 1881-Aug. 11, 1894; (semi-weekly, July-Dec., 1881). Vol. 53 has only 7 numbers. Vols. 1-10 [1879-1883] have sub-title: Journal universel d'électricité, revue scientifique illustré.

From 1879-1884, edited by Comte Th. Du Moncel; from 1884-1894, Dr. Cornelius Herz was titular directeur. General index, 1879-1883. Paris, 1884. Ceased publication August 11, 1894, and continued September 15 of same year as *L'Éclairage Électrique.* With the issue dated Jan. 4, 1908, the name *La Lumière Électrique* was resumed.

5920. **Magazine of Popular Science and Journal of Useful Arts.** Edited under the direction of the Society for the Illustration and Encouragement of practical science at the Lowther Arcade. 8vo. *London, 1836–1838*

Vols. 1–4. Complete.

Vol. 1, 1836; Vol. 2, 1836; Vol. 3, 1837; Vol. 4, 1838.

5921. **Magazine of Science and Artists', Architects' and Builders' Journal.** L. 8vo. *London, 1840–1852*

Vol. 1, (third edition), 1842.

MAGAZINE OF SCIENCE AND SCHOOL OF ARTS; intended to illustrate the most useful, novel and interesting facts of natural history and experimental philosophy, artistical processes, ornamental manufactures and the arts of life, 11 vols. London, 1840-1849.

MAGAZINE OF SCIENCE AND ARTISTS', ARCHITECTS' AND BUILDERS' JOURNAL. 2 vols. [12, 13]. London, 1850-1851.

MAGAZINE OF SCIENCE AND ARTISTS', ARCHITECTS' AND MINERS' JOURNAL. 2 vols. [14, 15]. London, 1851-1852.

5922. **The Magnet.** A journal of telegraphic gossip and miscellaneous reading. Semi-monthly. Folio. *New York, 1880*

Vol. 1, Feb. 14, 1880–Sept. 15, 1880. Complete.

5923. **Manchester Literary and Philosophical Society, Manchester.** Memoirs and Proceedings of the Manchester Literary and Philosophical Society. (Manchester Memoirs.) 8vo. *London, 1785–1887; Manchester, 1888–date*

Vols. 1–3, 1785–1790. Now complete by additions from Library file.

MEMOIRS of the Literary and Philosophical Society of Manchester. Series I, 5 vols., 1785-1802. (Library Vol. 1 is second edition, 1789). Series II, 15 vols., vi-xx, 1805-1860. Series III, 10 vols., xxi-xxx, 1862-1887. For the years 1882-1887 the title reads: *Memoirs* of the Manchester Literary and Philosophical Society.

PROCEEDINGS of the Manchester Literary and Philosophical Society. Vols. 1-26, 1857-1887.

MEMOIRS AND PROCEEDINGS of the Manchester Literary and Philosophical Society. Series IV, Vols. 1-10; from Vol. 11, numbered as Vol. 41, 1888-1896. With Vol. 41 the numbering by series is discontinued and each memoir is separately paged.

MEMOIRS AND PROCEEDINGS of the Manchester Literary and Philosophical Society. (Manchester Memoirs.) Vols. 41-51, 1896/97-date.

An index to the seventeen vols. of the *Memoirs.* Vol. 1 (old series) to Vol. 12 (new series) inclusive, is included in Vol. 12, second series, pp. 285-

318.—Second series, Vol. 13, 1856, has added to title-page: Memoir of John Dalton, and history of the atomic theory up to this time. By Robt. Angus Smith.—Third series, Vol. 9, 1883 has title: For the hundredth year of the Literary and Philosophical Society of Manchester. [1881]. A centenary of science in Manchester. By R. Angus Smith.—Fourth series, Vol. 6, 1892, has title: Memoir of James Prescott Joule. By Osborne Reynolds.

5924. **The Mechanics' Magazine and Journal of Engineering, Agriculture, Machinery, Manufactures and Ship Building.** 8vo and 4to. *London, 1823–1873*

Vols. 1–29, 31–69, 1823–1858.

MECHANICS' MAGAZINE, MUSEUM, REGISTER, JOURNAL AND GAZETTE: A weekly devoted to the accumulation of useful knowledge pertaining to mechanics. 69 vols. London, 1823-1858. 8vo.
Editors: 1823-Sept., 1852, J. C. Robertson; Oct., 1852-June, 1857, R. A. Brooman; July, 1857-Dec., 1858, R. A. Brooman and E. J. Reed.
THE MECHANICS' MAGAZINE AND JOURNAL OF ENGINEERING, AGRICULTURE, MACHINERY, MANUFACTURES AND SHIP-BUILDING. Weekly. 1859-1871. New series. 28 vols. 4to. The size of Vol. 13, 1865, was increased to small folio.
Editors: Jan., 1859-1860, R. A. Brooman and E. J. Reed; 1870-March, 1871, H. Gardner.
THE MECHANICS' MAGAZINE AND . . . JOURNAL OF SCIENCE, ARTS AND MANUFACTURES. July, 1871-Jan. 4, 1873.
Continued from 1873 as *IRON:* A journal [later "an illustrated weekly journal"] of science, metals and manufactures. Jan. 18, 1873-1891. From Jan., 1892-June, 1892. *Iron:* An illustrated weekly journal for iron and steel manufacturers.
In June, 1893, *Industries* absorbed *Iron* and continued as *Industries and Iron.*

5925. **Military Telegraph Bulletin.** Monthly. 4to. *London, 1884–1889*

Nos. 1–65. Complete.

MILITARY TELEGRAPH BULLETIN. For private circulation only. Nos. 1-4. March 15-June 15, 1884.
MILITARY TELEGRAPH BULLETIN. Nos. 5-36. July 15, 1884-Feb. 15, 1887.
MILITARY AND CIVIL SERVICE TELEGRAPH BULLETIN. Nos. 37-46, March 15, 1887-Dec. 15, 1887.
MILITARY TELEGRAPH BULLETIN. Nos. 47-64. Jan. 16, 1888-June 15, 1889. No issues for July and August, 1889. No. 65, Sept. 16, 1889, last issue.

5926. **Monthly Magazine.** Edited by J. A. Heraud, B. E. Hill and others. 8vo. *London, 1796–1843*

Vols. 1–46, 1796–1819.

MONTHLY MAGAZINE AND BRITISH REGISTER. 63 vols., Feb., 1796-Jan., 1826.
MONTHLY MAGAZINE; or British Register of Literature, Sciences and the Belles-Lettres. New series. 18 vols., 1826-1834; New series (again), 1 vol. in 1835.
MONTHLY MAGAZINE OF POLITICS, LITERATURE AND THE BELLES-LETTRES. Vols. 20-26, 1835-1838.
MONTHLY MAGAZINE. Edited by J. A. Heraud, B. E. Hill and others. 9 vols., 1839-1843.
Vols. 7-9 of the last series are described on the title-pages as Vols. 96-98, thus referring back to beginning of the publications.

5927. **National Telegraph Review and Operator's Companion.** Edited by James D. Reid. 8vo. *Philadelphia and New York, 1853–1854*
Vol. 1, No. 2. 1853.
Four numbers only were issued.

5928. **La Natura.** Revista mensuale, diretta da Rodolfo Cappanera. Monthly. *Florence (later Naples), 1877–1881*
Vols. 1–4. Complete.
L'ELETTRICITA. Revista mensuale diretta da L. Cappanera. Monthly. Vols. 1 and 2, Jan. 2, 1877-Dec., 1878. Florence. Vol. 1, 4to and Vol. 2, 8vo.
LA NATURA. Revista quindicinale. Vol. 3, Florence, 1881, 8vo.
LA NATURA. Revista mensuale. Vol. 4, Naples, 1881, 8vo.

5929. **Naturae Novitates.** Bibliographie neuer Erscheinungen aller Laender auf dem Gebiete der Naturgeschichte und der exacten Wissenschaften. Herausgegeben von R. Friedlaender und Sohn. Semi-monthly. 8vo. *Berlin, 1879–date*
Vols. 1–13, 1879–1891.
Issued annually in a volume of about 700 pages, with classified index.

5930. **Nature.** A weekly illustrated journal of science. Edited by J. N. Lockyer. 8vo. *London, 1869–date*
Vols. 1, 2, 4–57, 1869–1897. Partially completed by additions from Library file.

5931. **New London Mechanics' Register and Magazine of Science and the Useful Arts.** 8vo. *London, 1824–1828*
Vols. 1–4 and New Series, Vols. 1, 2, 1824–1826, 1827–1828. Complete.
THE LONDON MECHANICS' REGISTER. Weekly. 4 vols. Nov. 6, 1824-Nov. 4, 1826.
NEW LONDON MECHANICS' REGISTER AND MAGAZINE OF SCIENCE AND THE USEFUL ARTS. Reports of the lectures at the London Mechanics' Institution. 2 vols., 1827-1828.

5932. **Newton's Journal of Arts and Sciences.** 8vo. *London, 1820–1869*
New Series, vols. 1–23, 1855–1866.
LONDON JOURNAL OF ARTS AND SCIENCES. Containing reports of all new patents, with a description of their respective principles and properties; also original communications on subjects connected with science and philosophy, particularly such as embrace the most recent inventions and discoveries in practical mechanics. By W. Newton. 14 vols., 1820-1828. Second series, 9 vols. (1-9), by W. Newton and C. F. Partington. London, 1828-1832.
Newton's name does not appear on the first 2 vols. of series I. Series II, Vols. 1-5, 1822-1828, are edited by W. Newton and C. F. Partington; Vols. 6-9, 1828-1832 is edited by W. Newton alone.
THE LONDON JOURNAL OF ARTS AND SCIENCES, and Repository of Patent Inventions. London. A union of *The London Journal of Arts and Sciences,* and *The Repository of Patent Inventions* (No. 5943). Conducted by W. Newton. Conjoined series, or, third series. Vols. 1-22. London, 1832-1843.
The word "manufacture" was inserted after "science" in Vol. 22.
NEWTON'S LONDON JOURNAL OF ARTS AND SCIENCES: Being a record of the progress of inventions as applied to the arts. Established in the year 1820. London. New Series, 23 vols. (1-23). London, 1855-1866.

Analogical index to Vols. 1-23, first and second series. By W. Newton. London, [1834?] 8vo.
Alphabetical index to the names of patentees in first and second series London, n. d., 8vo.
Extra publication: Letters and suggestions upon the amendment of the laws relative to patents for inventions; being a series of communications originally published in the *London Journal of Arts and Sciences;* together with papers and documents connected with the reform of the patent law. London, [1835] 8vo.

New York Review of the Telegraph and Telephone and Electrical Journal.

See *Electrical Review,* New York. (No. 5886.)

Nicholson's Journal of Natural Philosophy, Chemistry and Arts.

See *Journal of Natural Philosophy.* (No. 5912.)

5933. **Operator, The.** Semi-monthly. 4to and L. folio. *New York, 1874–1885*

Vols. 9–16. Now complete by gift of Mr. W. J. Johnston.
THE OPERATOR. Semi-monthly. Vol. 1, March 1, 1874-Aug. 15, 1874.—The telegraph operators' journal. Semi-monthly. Vols. 2, 3; Vol. 4, Nos. 1-8, Sept. 1, 1874-Dec. 15, 1875.—A journal of scientific telegraphy. Semi-monthly. Vol. 4, No. 9-end. Vol. 5 and Vol. 6, Nos. 1-6, Jan. 1, 1876-Nov. 15, 1876.—A journal of scientific and practical telegraphy. Semi-monthly. Vol. 6, No. 7-end; Vols. 7-10; Vol. 11, Nos. 1-20, Dec. 1, 1876-Oct. 15, 1880.—A journal of telegraphic, telephonic and electrical science, literature, news and progress. Semi-monthly. Vol. 11, Nos. 21-end and Vols. 12, 13, Nos. 1-22. Nov. 1, 1880-Oct. 14, 1882. Weekly. Vol. 13, Nos. 21-31, Oct. 21, 1882-Dec. 30, 1882.
THE OPERATOR AND ELECTRICAL WORLD. A Journal for telegraphists, telephonists, electricians and electrical engineers. Weekly. Vol. 14, Nos. 1-16, Jan. 6, 1883-April 21, 1883. L. folio.
THE OPERATOR. A journal of telegraphic literature, news and miscellaneous reading. Semi-monthly. Vols. 14-16, May 1, 1883-Sept. 19, 1885. L. folio.
For continuation, see *Electrical World,* (No. 5887).

5934. **Our Magazine.** A monthly periodical. 12mo. *Edinburgh, 1855–1856*

Vol. 1. Complete.
Contains original articles chiefly contributed by the officials of the Electric and International Telegraph Company.

5935. **Penny Mechanic and the Chemist.** 8vo. *London, 1836–1842*

Vol. 3, 1838.
PENNY MECHANIC. A magazine of the arts and sciences. Vol. 1, Nos. 1-37, Nov. 5, 1836 to July 8, 1837.
PENNY MECHANIC AND THE CHEMIST. A magazine of the arts and sciences. Vol. 1, Nos. 38-40, July 15-July 29, 1837; Vols. 2-6; new series, Vols. 1, 2 and third series, Vols. 1, 2, also numbered as Vols. 7-9.

Philosophical Magazine.

See *London, Edinburgh and Dublin Philosophical Magazine.* (No. 5916.)

Photographic Journal.

See *Photographic Society.* (No. 5936.)

5936. **Photographic Society of London.** 8vo. *London, 1853–date*

Vol. 1, March 3, 1853–June 30, 1854.
PHOTOGRAPHIC SOCIETY OF LONDON. Journal, containing the

transactions of the society and a general record of photographic art and sciences. Vols. 1-15, 1853-1873.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN. Journal, containing the Transactions of the Society. Vol. 16, 1873-1876.

Editors: Vols. 1, 2, A. Henfrey; Vol. 3, J. R. Major; Vol. 4, W. Crookes; Vols. 5-12, H. W. Diamond; Vol. 13, H. W. Diamond and J. Spiller; Vol. 14, J. Spiller; Vols. 15, 16, J. Spiller and H. B. Pritchard.

PHOTOGRAPHIC JOURNAL, including the Transactions of the Photographic Society of Great Britain (later the Royal Photographic Society of Great Britain). New series. Vols. 1-date. 1876-date.

The Society was instituted in 1853.

5937. **Physical Society of London. Proceedings.** 8vo.

London, 1876–date.

Vols. 1–13, 1876–1895. Now complete by additions from Library file.

Vol. 1. March 21, 1874-June 26, 1875.—Vol 2, Nov., 1875-Dec., 1878.—Vol. 3, Jan., 1879-July, 1890.—Vol. 4. Aug., 1880-Dec., 1881.—Vol. 5, Jan., 1882-March, 1884.—Vol. 6. April, 1884-Febr., 1885.—Vol. 7. Febr., 1885-Jan., 1886.—Vol. 8. Febr., 1886-April, 1887.—Vol. 9. April, 1887-June, 1888.—Vol. 10. June, 1888-June 1890.—Vol. 11. June, 1890-June, 1892.—Vol. 12. Oct., 1892-Jan., 1894.—Vol. 13, Jan., 1894-Oct., 1895.—Vol. 14. Oct., 1895-Oct., 1896.—Vol. 15. Oct., 1896-Oct., 1897.—Vol. 16, Oct., 1897-Oct., 1899.—Vol. 17. Oct., 1899-Dec., 1901.—Vol. 18. April, 1902-Dec., 1903.—Vol. 19. May, 1904-Dec., 1905.—Vol. 20. Dec., 1905-Dec., 1907.

Abstract of physical papers from foreign sources. Vols. 1-3 (edited by J. Swinburne). London, 1895-1897.

The Physical Society of London was founded 1874.

5938. **Polytechnic Journal.** A monthly magazine of art, science and general literature. 8vo. *London, 1839–1844*

Vols. 1–6, Sept., 1839–June, 1842.

POLYTECHNIC JOURNAL is complete in 8 vols. and continued as: *London, Edinburgh and Dublin Polytechnic Journal.* New Series, Vols. 1, 2. 1843-1844.

Part of Vol. 2 of *Polytechnic Journal,* was republished under the title: *The London Polytechnic Journal,* No. 1, 1840; also the *Polytechnic Magazine,* No. 1, Jan., 1840; also the *Polytechnic Review,* No. 1, Jan., 1840.

5939. **Postal, Telegraphic and Telephonic Gazette.** Weekly. Folio. *London, 1883*

Vol. 1, Aug. 3, 1883–Aug. 1884. Complete.

5940. **Practical Mechanics' Journal.** 8vo and 4to. *Glasgow and London, 1848–1870*

Vols. 1–7, 1848–1855.

A complete set comprises three series: Series I, 8 Vols., 1848-1856. Series II, 9 Vols., (9-17) Glasgow, London, 1856-1865. Series III, 5 vols., (18-22), London, Glasgow, 1865-1870. Glasgow (later) London, 1848-1870.

Editors: W. and J. H. Johnson.

Illustrated index [to Vols. 1-6], to which is added concise information relative to patents, by W. and J. H. Johnson. London, 1854.

THE PRACTICAL MECHANICS' JOURNAL record of the Great Exhibition, 1862. London, 1862. 4to.

The *Journal* succeeded *Practical Mechanics' and Engineers' Magazine.* First series, Vols. 1-4, 1841-1845. Second series, Vols. 1-2, (5-6), 1845-1847. Glasgow, 1842-1847. 4to.

Quarterly Journal of Science, Literature and the Arts.

See *Royal Institution of Great Britain, Journal.* (No. 5946.)

5941. **Register of the Arts and Sciences.** Containing a correct account of several hundred of the most important and interesting inventions, discoveries and processes. 8vo.

London, 1824–1827

Vols. 1–4. Complete.

Continued as: *Register of Arts and Journal of Patent Inventions.* Being an improved series and a continuation of *The Register of the Arts and Sciences.* Edited by L. Hebert. 7 vols. London, 1828-1832. 8vo.

5942. **Repertorium der Physik.** Enthaltend eine vollstaendige Zusammenstellung der neuern Fortschritte dieser Wissenschaft. Unter Mitwirkung der Herren Beetz, Broch, Jacobi, Knochenhauer, Lamont, Lejeune-Dirichlet, Mahlmann, Minding, Moser, Neumann, Radicke, Riess, Roeber, Seebeck und Strehlke herausgegeben von Heinrich Wilhelm Dove und Ludwig Moser. 8vo. *Berlin, 1837–1849*

Vols. 1–8. Complete.

The title of Vols. 6-8 varies slightly. The editor's name does not appear on the title-page of Vols. 6-8; on title-page of Vols. 2-5, Hrsg. H. W. Dove. *Contents:* Vol. 1, 1837. I. Allgemeine Physik, (von H. W. Dove). II. Mathematische Physik. Ueber die Darstellung ganz willkuerlicher Funktionen durch Sinus—und Cosinus—Reihen von L. Dirichlet. III-VI. Galvanismus. Elektromagnetismus, Magneto-Elektricitaet, Thermo-Magnetismus (von L. F. Moser). Vol. 2, 1838. VII. Lehre von der Elektricitaet von F. Riess. VIII. Magnetismus und einige Nachtraege zum Galvanismus und zum induzirten Magnetismus von L. Moser. Literatur der Optik von H. W. Dove. Vol. 3, 1839. IX. Akustik von A. Roeber und F. Strehlke. X. Theoretische Optik von (G.) Raedicke. XI. Meteorologie (von H. W. Dove). Vol. 4, 1841. XI. [Continuation] Meteorologie (von W. Mahlmann und H. W. Dove). XII. Waerme (von H. W. Dove). Vol. 5, 1844. XIII. Mechanik, bearbeitet von F. Minding. XIV. Allgemeine Gezetze der Wellenbewegung von O. J. Broch. XV. Literatur des Magnetismus und der Elektricitaet von H. W. Dove. XVI. Ueber das Auge von L. Moser. Vol. 6, 1842. I. Akustik von A. Seebeck. II. Die Lehre von der Elektricitaet. [2. Bericht] von P. Reiss. Vol. 7, 1846. XVII. Besondere Gesetze der Wellenbewegung von O. J. Broch. XVIII. Allgemeine Physik von (K. W.) Knochenhauer. XIX. Magnetismus der Erde [2. Bericht] von J. Lamont. Vol. 8 [1849]. XX. Galvanismus von W. Beetz. XXI. Akustik von A. Seebeck.

These eight volumes form a continuation to Fechner's (Gustav Theodor) *Repertorium der Experimentalphysik:* Enthaltend eine Zusammenstellung der neueren Fortschritte dieser Wissenschaft. Vols. 1-3 (no more published). Leipzig, 1832. L. 8vo. (No. 865).

5943. **The Repertory of Patent Inventions,** and other discoveries and improvements in arts, manufactures and agriculture; being a continuation on an enlarged plan, of the Repertory of Arts and Manufactures. Monthly. 8vo. *London, 1794–1862*

Vols. 1–16, 1794–1802; second series, Vols. 1–45, 1802–1825; new series, Vols, 1–4, 6–9, 11–18, 1834–1842; enlarged series, Vols. 1–40, 1843–1862.

Founded as *Repertory of Arts and Manufactures,* consisting of original communications, specifications of patent inventions. Vols. 1-16, June, (?) 1794-May, (?) 1802.

REPERTORY OF ARTS, MANUFACTURES AND AGRICULTURE. Consisting of original communications, specifications of patent inventions. Second series. Vols. 1-46, June, 1802-June, 1825.

REPERTORY OF PATENT INVENTIONS and other discoveries and improvements on art, manufactures and agriculture; being a continuation, on an enlarged plan, of the *Repertory of Arts and Manufactures.* Third series, Vols. 1-16, July, 1825-Dec., 1833. New series, Vols. 1-18, Jan., 1834-Dec., 1842. Enlarged series, Vols. 1-40, Jan., 1843-Dec., 1862.

An Analytical Index to the sixteen volumes of the first series of the *Repertory of Arts and Manufactures:* being a condensed epitome of that work; accompanied by alphabetical lists of authors and patentees and of all patents granted for inventions from 1795 to April, 1802. To which is added a general index to the first eight volumes of the second series. London, 1846.

A general index of the *Repertory of Patent Inventions* from 1815-1845, inclusive. London, 1846.

Index to all patents granted in England, from 1815-1845, inclusive, being an appendix to the general index of the *Repertory of Arts,* etc., during those periods. London, 1849.

Index to all patents granted in England from 1846-1850, inclusive. London, 1850.

Index of patentees for January to December, 1851. Index of inventions from January to December, 1851. Index to the *Repertory of Arts,* etc. Vols. 17 and 18, 1851. London, 1852.

The volumes up to 1825 bear as imprint: Printed for G. and T. Wilkie; and up to 1862, Published for the Proprietors by T. and G. Underwood. The index published in 1807 has the imprint, Printed for J. Watt; and the indexes of 1846 and 1849: Published for the Proprietor by A. Macintosh.

Review of the Telegraph and Telephone.

See *Electrical Review,* New York. (No. 5886.)

5944. **Revue Internationale de L'Électricité et de ses Applications.** Directeur: A. Montpellier. 4to. *Paris, 1885–1890*

Nos. 109, 112, 116, 117, 119, 120, (1890).

Complete in 120 Nos. Years 1-6, or Vols. 1-11, 1885-1890. Incorporated with *l'Electricien* (No. 5890) in Dec., 1890.

5945. **La Rivista Telegrafica.** *Naples, 1881– ?*

Vol. 1, 1881–1882.

5946. **Royal Institution of Great Britain. Journal.** Quarterly. 8vo. *London, 1816–1831*

Vol. 23, April–June, 1828. Now complete, except Vols. 13, 23–29 and 1, 2, by additions from Library file.

JOURNAL OF SCIENCE AND THE ARTS. Edited at the Royal Institution of Great Britain. Quarterly. Vols. 1-6. London, 1816-1819.

QUARTERLY JOURNAL OF SCIENCE, LITERATURE AND THE ARTS. Vols. 7-29. London, 1819-1830.

ROYAL INSTITUTION OF GREAT BRITAIN. JOURNAL. Vols. 1, 2, Oct., 1830-Nov., 1831. London, 1831.

Other publications of the Royal Institution:

Notices of the Proceedings at the Meetings of the Members of the Royal Institution of Great Britain; with abstracts of the Discourses delivered at the Evening Meetings. Vols. 1-17. London, 1854/5-1902/4.

Index to Vols. 1-4 in Vol. 4, 1862/6 [pp. 597-610]. Index to Vols. 1-12 in Vol. 12, 1887/9, [pp. 581-614].

Established under royal charter 1800; enlarged and confirmed 1810.

5947. Royal Society of London. *1665–date.*

Philosophical Transactions abridged, with notes and biographical illustrations. By C. Hutton and others. Vols. 1-18 (complete), 1665-1800. London, 1809. 4to.

Philosophical Transactions and Collections Abridged and disposed under general heads. 10 vols. in 11. (1665–1750.) London, 1722–1856. 4to.

By gift of Mr. Edward D. Adams the Library now possesses a complete set of the **Philosophical Transactions** and the **Proceedings** of the Royal Society, the **Catalogue of Scientific Papers** and various **Histories** of the Society.

PHILOSOPHICAL TRANSACTIONS, giving some account of the present undertakings, studies and labors of the ingenious in many considerable parts of the world. Vols. 1-65, London, 1665-1775. Small 4to.

The first five volumes went through several editions between 1705 and 1781. The first three volumes were originally edited by Lowthrop; 4 and 5 by Jones; 6 by Reid and Gray; 7 and 8 by Eames and Martyn.

Editors: 1665-June, 1677, Nos. 1-136, H. Oldenburg; Jan., 1678-Febr., 1679, Nos. 137-142, N. Grew; 1683-1684, Nos. 143-166, R. Plot; 1685, Nos. 167-178, W. Musgrave; 1686-1687, Nos. 179-191, E. Halley; 1691-1694, Nos. 192-214, R. Waller; 1695-1713, Nos. 215-237, Sir H. Sloane; 1714-1719, Nos. 338-363, G. Halley; 1720-1727, Nos. 364-398, J. Jwin; 1727-1728, Nos. 399-406, W. Rutty; 1729-1750, Nos. 407-497, C. Mortimer.

PHILOSOPHICAL TRANSACTIONS. Vols. 66-81, London, 1776-1791. Small 4to.—For 1792-1852 (no vol. Nos.), 62 vols. Large 4to.—Vols. 143-date. After 1866, Vol. 177, published in two series: A. Mathematical and Physical—B. Biological. Large 4to.

The printing of the *Philosophical Transactions* from time to time was under the supervision of the respective secretaries to the 47th vol. From this period, 1751, the *Transactions* were published under the superintendence of a Committee of the Society.—The title *Transactions* was changed to *Collections* for one volume, 13, 1678. From Vol. 14, 1682, the old title *Transactions* was resumed.—No volumes were published for the years, 1679-1682, but the deficiency is partially supplied by *Philosophical Collections* by R. Hooke, Nos. 1-7. Small 4to.—There were no volumes for 1688-1690, and included in Vol. 16 are all that were published for 1691 and 1692, viz., Nos. 192 to 195, which are paged 451-578.—From 1751-1762 only one half volume was issued annually, and from 1763-1895 a complete volume, consisting of two or more parts, was issued annually.—In 1791 the word "Volume" and the number in Roman numerals were dropped and the vols, numbered by the year; the serial number was taken up again with Vol. 143.—Vols. 41, 44, 48-52, 57, 59, 61, 63-date are in two parts, excepting Vols. 90, 109, 114, 119, 143, 146, 147, 151, 154, 171, 172, 174, which are each in three parts, and Vols. 116, 136, 173 each in four parts.—A general index: or alphabetical table, to all the *Philosophical Transactions,* from Jan. 1677/78—Dec., 1693; and a catalogue of the books mentioned in the *Transactions.* London, S. Smith and B. Walford, 1694. (Appended to Vol. 17, 1693, of the *Philosophical Transactions.*)—A general index to the *Philosophical Transactions* from the first to the end of the seventieth volume, 1665-1780. By Paul Henry Maty. 802 pp. London, L. Davis, 1787. 8vo.—A continuation to the alphabetical index of the matter contained in the *Philosophical Transactions,* from Vol. 71 to Vol. 90, 1781-1820. London, W. Bulmer and W. Nicol. 225 pp. 4to.—A continuation of the alphabetical index from 111-120. 1821-1830. 101 pp. London, R.

Taylor, 1833. Folio.—An index to the anatomical, medical, chirurgical and physiological papers contained in the *Transactions* of the Royal Society from the commencement of that work to the end of the year 1813. Chronologically and alphabetically arranged. 101 pp. Westminster, M. Stace, 1814. 4to. (Preface signed J. B., *i.e.*, James Briggs.)

Supplements: Vol. 43, 1744-5. The Crounian lectures on muscular motion. 1744-1745. Read before the Society by James Parsons. 86 pp., pl. London, C. Davis, 1745. 8vo.—Vol. 44, part I, 1746. Human physiognomy explained: Crounian lectures on muscular motion, 1746. Read before the Society by James Parsons. 2 p. l. 8+82 pp., pl. London, C. Davis, 1747, 8vo.—Vol. 44, Part II. The Croncan lectures on muscular motion by Browne Langrish. Read before the Society, 1747. 66 pp. London, C. Davis, 1748, 8vo (with Vol. 44, Part II, of the *Philos Trans.*).

MISCELLANEA CURIOSA, containing a collection of some of the principal phenomena in nature. . . . discourses read and delivered to the Royal Society. Revised and corrected by W. Derham. Vol. I, third edition. London, 1726. 8vo. (Wheeler Gift.) Complete in 3 vols.; first edition, 1705-1707; second edition, 1708-1727; a third edition of Vol. I was published in 1726.

MEMOIRS OF THE ROYAL SOCIETY, being a new abridgment of the *Philosophical Transactions.* Vols. 1-5, 8, 9. From 1665-1740. Second edition. London, 1745. 8vo. (Vols. 3 and 4 are first edition, 1739.) (From Library file. Complete in 10 vols., first edition published 1738-1741.)

ABSTRACT OF THE PAPERS printed in the *Philosophical Transactions.* Vols. 1-4, 1800-1843. London, 1832-1843. 8vo. Continued as

ABSTRACT OF THE PAPERS communicated to the Royal Society. Vols. 5, 6, 1843-1854. London, 1851-1854. 8vo. Vols. 3-6 are also entitled in text *Proceedings* Nos. 1-102.

PROCEEDINGS OF THE ROYAL SOCIETY, being a continuation of the series entitled "Abstracts of the Papers" communicated to the Royal Society of London. Vols. 7-date. Febr. 23, 1854-date. London, 1856-date. With Vol. 76, 1905, the *Proceedings* are enlarged to super-royal 8vo and issued in two series, A and B, corresponding with the *Philosophical Transactions.* (Series A and B begin with No. 534.)

CATALOGUE OF SCIENTIFIC PAPERS. 1800-1883. Compiled and published by the Royal Society of London. Vols. 1-12. London, 1867-1902. 4to. Vols. 1-6 for 1800-63; Vols. 7-8 for 1864-1873; Vols. 9-11 for 1874-1883; Vol. 12, supplement. Superseded in 1903 by the International Catalogue of Scientific Literature, of which the Library contains a set to date, the gift of Mr. Edward D. Adams, covering the sections of physics, mechanics, chemistry and mathematics.

BIRCH, THOMAS. (1705-1766.) *HISTORY OF THE ROYAL SOCIETY,* in which the most considerable of those papers communicated to the Society which have not been published are inserted in their proper order as a supplement to the *Philosophical Transactions.* 4 vols. London, 1756-1757. 4to.

HILL, SIR JOHN. (1716?-1775.) *REVIEW OF THE WORKS OF THE ROYAL SOCIETY.* Containing animadversions on such of the papers as deserve particular observation. In 8 parts. Second edition. (First edition, 1751.) viii+265 pp. London, 1780. 4to.

"An attempt to place the Royal Society and their Transactions in a ludicrous light, because the body would not admit him a member." (Lowndes.)

SPRAT, THOMAS. (1635-1713.) *HISTORY OF THE ROYAL SOCIETY,* for improving of Natural Knowledge. 438 pp. London, 1667. 8vo.

THOMSON, THOMAS. (1773-1852.) *HISTORY OF THE ROYAL SOCIETY,* from its Institution to the end of the XVIII century. 552 pp. London, 1812. 4to.

WELD, CHARLES RICHARD. (1813-1869.) *A HISTORY OF THE ROYAL SOCIETY,* with memoirs of the Presidents, compiled from authentic documents. 2 vols. London, 1847. 8vo.

RECORD OF THE ROYAL SOCIETY OF LONDON. Second edition. London, 1901. 8vo. (First edition published in 1897.)

Royal Photographic Society of Great Britain.

See Photographic Society of London.

5948. **St. Martin's Magazine.** Monthly. 8vo. *London, 1874–1875*

Vol. 1, Nos. 9–12, Sept.–Dec. 1875.

Only one vol. published. Incorporated with *The Telegraphist* (No. 5963), in 1876.

5949. **Science.** A weekly journal devoted to the advancement of science, publishing the official notices and proceedings of the American Association for the Advancement of Science. 4to. Small folio.

New York, Cambridge (Mass.), New York, 1880–date.

Vols. 1–4, 1883–1884. Now complete by additions from Library file, except Vols. 1–3 (1880–1882) 10–23 and new series Vols. 1–6, 9 and 10.

SCIENCE. A weekly record of scientific progress. Illustrated. Edited by John Michels. Vols. 1-3, July, 1880-March, 4, 1882, or Nos. 1-82. 4to. New York. Vol. 3 consists only of 3 Nos., dated Jan. 14, 21 and March 4.

SCIENCE. An illustrated journal published weekly. Vols. 1-23, Feb., 1883-March 23, 1894. The first 5 vols. were published in Cambridge, Mass., and the remainder in New York. The size changed to small folio from Vol. 10 to the end of the old series. No title-page and index published to Vols. 22 and 23.

SCIENCE. A weekly journal devoted to the advancement of science. New series. Vols. 1-date, Jan., 1895-date. Size changed again to 4to. Sub-title reads from Vol. 13, 1901: A weekly journal devoted to the advancement of science, publishing the official notices and proceedings of the American Association for the Advancement of Science.

5950. **Scientific American.** Folio. *New York, 1845–date.*

Vols. 40 to 54, 56 and 57. Now complete by gift of *Electrical World* and additions from Library file, except old series I, 14 vols. and Vols. 55, 59 and 77 of new series.

SCIENTIFIC AMERICAN. The advocate of industry and journal of scientific, mechanical, and other improvement. 14 Vols. Folio; Vol. 1, in imp. folio. New York, Aug., 1845-June, 1859.

SCIENTIFIC AMERICAN. A journal of practical information in art, science, mechanics, agriculture, chemistry and manufactures. New series. Vols. 1 to date. New York, July, 1859-date.

Edited 1845-1871 by Salem H. Wales; afterward by O. D. Munn and A. E. Beach.

SEPARATE PUBLICATIONS

SCIENTIFIC AMERICAN EXPORT EDITION. Monthly. Folio. Vols. 1 to date. New York, 1878 to date.

SCIENTIFIC AMERICAN BUILDING EDITION. Monthly. Folio. New York, 1885-1905. Vols. 1-39. The years 1885-1894. Vols. 1-18, are also called: Architects' and Builders' Edition. In June, 1905, (Vol. 39, No. 6) superseded by *American Homes and Gardens.*

AMERICA CIENTIFICA E INDUSTRIAL. Monthly. Folio. Vols. 1 to date. Nueva York, 1890-date.

5951. **Scientific American Supplement.** (2 vols. per year). Folio. *New York, 1876–date*

Now complete, except Vols. 13, 25, 26 and 27, by gift of Mr. Edward D. Adams.

There are two indexes, as follows: Catalogue of valuable papers contained in the *Scientific American Supplement*, 1876-1902, and another covering the years, 1876-1905. New York, 1903 and 1906.

5952. **Scientific Gazette;** or Library of Mechanical Philosophy, Chemistry and Discovery. Edited by C. F. Partington. 4to. *London, 1825–1826*

Nos. 1–18, July 2, 1825–Oct. 29, 1825. Complete in 2 vols. consisting of 31 numbers.

5953. **Scientific Memoirs,** selected from Transactions of foreign academies of science and learned societies and from foreign journals. Edited by Richard Taylor. 8vo. *London, 1837–1852*

Vols. 1–5.

Vol. 1, 1837; Vol. 2, 1841; Vol. 3, 1843; Vol. 4, 1847; Vol. 5, 1852. Vols. 1-4 printed by R. and J. E. Taylor and Vol. 5 by Taylor and Francis. Vols. 1-4 each in 4 parts and Vol. 5 in 5 parts.

After Vol. 5 the publication was continued in two divisions, as follows:

SCIENTIFIC MEMOIRS: Natural History. New series, Vol. 1, parts 1-4. Edited by A. Henfrey and T. H. Huxley. 1852-1853. Only one volume published.

SCIENTIFIC MEMOIRS: Natural Philosophy. New series. Vol. 1, parts 1-4. Edited by John Tyndall and W. Francis. 1852-1853. Only one volume was published.

5954. **Shaffner's Telegraph Companion.** Devoted to the science and art of the Morse telegraph. By Tal. P. Shaffner. Monthly and quarterly. 8vo. *New York, 1854–1855*

Vols. 1, 2. Complete.

Vol. 1 is complete in 6 numbers, Jan.-June; Vol. 2 in 4 numbers. There are no issues from July-Dec., 1854. Vol. 1 has a portrait of Sam. F. B. Morse and Vol. 2 of Tal. P. Shaffner. The first number of Vol. 2 consists of Morse's defense against charges of Prof. Henry, with index. (See No. 5857.)

5955. **Société Internationale des Électriciens. Bulletin.** Monthly. 8vo. *Paris, 1884–date*

Vols. 1–8, 1884–1891. Now complete by additions from Library file.

A complete set comprises Vols. 1-17, 1884-1899; New series. Vols. 1-date. 1900-date.

Table générale des matières. First series. 1884-1900. Supplément au Bulletin mensuel, No. 13 (Second series) March, 1902.

5956. **Society of Arts. Society Instituted at London, for the Encouragement of Arts, Manufactures and Commerce; with the Premiums Offered. Transactions.** 8vo. *London, 1783–1849*

Vols. 1–54, for 1783–1842; Vols. 1, 2 are third editions and Vols. 3–5 second editions.

A complete set comprises 57 vols. in 8vo, and a supplemental vol. published in 1852, in 4to. Vol. 56 is entitled "Abstracts of Proceedings, etc."

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The supplemental volume contains: I. Charter of Incorporation. II. Address of Council. III. Papers read to the Society during the sessions, 1846-1847, 1847-1848. Vols. 1 and 2. London, 1847, 1849. 4to. (Discontinued after this date).
Commonly called the Society of Arts. Founded, 1754. Incorporated, 1847.

5957. **Il Telegrafista.** Rassegna mensile di elettricita, telegrafica, telefonici, etc. 8vo. *Rome, 1881–1889*
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IL TELEGRAFISTA. Vols. 1, 2. Roma, 1881-1882.
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5958. **The Telegraph and Railway Era.** A penny weekly commercial journal. An organ also for mining, banking, insurance, steam and other interests. 4to. *London, 1870–1871*
Vol. 1, Nos. 1–7, Dec. 17, 1870–Jan. 28, 1871. Complete.

5959. **Telegraph Electrical Society. Melbourne.** 8vo. *Melbourne, 1875–1881*
Transactions. Vol. I.—Journal. Vol. II. Complete.
Transactions. Vol. 1, Nos. 1-13, 1874-1878. Journal. Vol. 2, Nos. 14-18, 1879-1881.
The Journal is a continuation of the Transactions. Transactions, Vol. 1, Nos. 1-13, Aug. 8, 1874-Oct. 2, 1878. Journal, Vol. 2, Nos. 14-18, Oct., 1878-Dec., 1880.

5960. **The Telegrapher.** 4to. *New York, 1864–1877*
Vols. 4, 5, 9–13, 1867–1877. Now complete by gift of the McGraw Publishing Company.
THE TELEGRAPHER. Published by the National Telegraphic Union. Vols. 1-6, Nos. 1-214. Monthly from Oct. 16, 1864-Aug. 15, 1867; weekly from Aug. 31, 1867-Aug. 20, 1870.
THE TELEGRAPHER. A journal of electrical progress. Edited by J. N. Ashley. Vols. 7-13, Nos. 215-546. Weekly. Aug. 27, 1870-Feb. 3, 1877. Vol. 13 consists only of five numbers.
United in 1877 with *Journal of the Telegraph* (No. 5913).

5961. **Telegraphic Journal.** A weekly record of electrical progress. 4to. *London, 1864*
Vols. 1–2, Jan. 2, 1864–Dec. 24, 1864. Complete.
Telegraphic Journal and Electrical Review.—*Telegraphic Journal and Monthly Illustrated Review of Electrical Science.*—*Telegraphic Journal and Monthly Review of Electrical Science.* See *Electrical Review,* London. (No. 5885.)

5962. **The Telegraphist.** A monthly journal of popular electrical science. Edited by W. Lynd. 4to. *London, 1883–1886*
Vols. 1–3. Complete.
THE TELEGRAPHIST. A monthly journal for postal, telephone, and railway telegraph clerks. Vol. 1, Nos. 1, 2. Dec. 1, 1883-Jan., 1, 1884.—A monthly journal for postal, telephone, cable, and railway telegraph clerks.

Vol. 1, Nos. 3-6, Febr. 1, 1884-May 1, 1884.—A monthly journal of popular electrical science. Vol. 1, Nos. 7-end (No. 12). June 1, 1884-Nov. 1, 1884; Vol. 2, Dec. 1, 1884-Nov. 2, 1885. (Nos. 13-24); Vol. 3, Dec. 1, 1885-June 1, 1886. (Nos. 25-31.)

5963. **The Telegraphist and Electrician.** 4to. *London, 1876–1877*
Vol. 1, Nos. 1, 5–12; Vol. 2, Nos. 13–21.

THE TELEGRAPHIST. A literary and scientific journal. Monthly. Vol. 1, Feb., 1876-Dec., 1876.
THE TELEGRAPHIST AND ELECTRICIAN. The journal of the English telegraph staff. Vol. 2, Jan., 1877-Sept., 1877.
Consolidation (1876) of *St. Martin's Magazine* and the *Telegraphist* (No. 5948).

5964. **The Telephone.** A review of electrical science. Semi-monthly. Folio. *London, 1889*
Vol. 1, Nos. 1, 3–11, 13–24.

Vol. 1, only was published.

5965. **The Year-Book of Facts in Science and the Arts.** Sm. 8vo. *London, 1838–1881*
Years 1839–1845; 1847–1848; 1850; 1855–1856; 1859–1860; 1862; 1874–1875. Year 1868 has been added from Library file.

THE YEAR-BOOK OF FACTS IN SCIENCE AND ART: Exhibiting the most important discoveries and improvements of the past year, in mechanics; natural philosophy; electricity; chemistry; zoology and botany; geology and mineralogy; astronomy; meteorology and geography. Edited by John Timbs. For the years 1838-1873. 35 vols. London, 1839-1874.
THE YEAR-BOOK OF FACTS IN SCIENCE AND THE ARTS. For the years 1874-1880. London, 1877-1881.
Editors: For the years 1874-1875, C. W. Vincent; for 1876-1880, James Mason.
Extra-volume: The Year-book of facts in the great exhibition of 1851; its origin and progress, constructive details of the building, the most remarkable articles and objects exhibited, etc. By John Timbs. 4+348 pp. London, 1851.
Extra-volume: The Year-book of facts in the international exhibition of 1862. 8+354 pp. London, 1862.
Superseded *Arcana of Science* and *Annual Register of the Useful Arts* (No. 5865).

5966. **Zeitschrift des Deutsch-Oesterreichischen Telegraphen-Vereins.** Herausgegeben in dessen Auftrage von der Kgl. Preussischen Telegraphen-Direktion. Redigirt von P. W. Brix. Monthly. 4to. *Berlin, 1854–1869*
Years 1–5, 9–13.

Complete in 16 Vols. In 1872 a continuation was published with the title: Annalen der Telegraphie, herausgegeben von P. W. Brix. In Anschluss des Deutsch-Oesterreichischen Telegraphen-Vereins. 8vo. Only one number appeared.

APPENDIX

The Sympathetic Telegraph

APPENDIX

The Sympathetic Telegraph

THE books in the following lists contain references to an imaginary magnetic telegraph which occasionally figures in early electrical literature. As first described by Porta, it consists of a pair of magnetic needles mounted on a dial with the letters of the alphabet equally spaced around the circumference, the two needles having been magnetized by the same magnet. When used by two persons distant from each other, a movement of the needle of one instrument was supposed to cause a synchronous movement of the needle of the other instrument.

The sympathetic telegraph was first described in print by Giovanni Battista della Porta in 1558 (No. 47), who is supposed to have obtained the idea from Cardinal Bembo. H. B. Wheatley, in a paper *On the sympathetic telegraph* (No. 4156), says "He [Porta] is said to have derived the idea from Cardinal Bembo, but the observations of that celebrated historian and poet on the subject have not yet been traced."

Pietro Bembo (1470-1547) was a distinguished Italian prelate and scholar of whom Hallam says, "We must place him among the ornaments of literature in the XVI. century." In 1513 he became secretary to Pope Leo X., and in 1529 was appointed historiographer to the Republic of Venice. Shortly afterwards, he was appointed librarian of Saint Mark's, Venice. The cardinal's hat was conferred on him in 1539 by Paul III., who was also a patron of letters and science,

Initial from Porta, 1558; tail-piece from Cabeo, 1629.

and to whom, by permission, Copernicus dedicated his celebrated treatise *De orbium cœlestium revolutionibus,* 1543, and Affaitato his *Phisicae ac astronomicae considerationes* (No. 27). A posthumous collected edition of the works of Fracastorio (No. 39), author of the extraordinary poem *De morbo gallico,* was, by permission, dedicated to Cardinal Bembo. The complete works of Bembo were published in four volumes in Venice in 1729.

Gilbert in *De magnete* is oddly silent as to the sympathetic magnetic telegraph, although frequent references to Porta indicate that the Colchester philosopher was intimately acquainted with *Magiae naturalis.* Though on the whole appreciative of the work of Porta, Gilbert criticizes in severe terms some of his statements, and it is surprising that the description of the telegraph failed to incite choleric mention. Galileo in *Systema cosmicum,* 1635 (No. 108), ridicules the sympathetic telegraph. In the course of a dialogue, which form of exposition Galileo usually employed in his writings, a mythical Sagredus is made to say that one had offered to sell him the secret art by which, through the attraction of a certain sympathetic magnet needle, it was possible to converse over a space of two or three thousand miles. Sagredus expressed willingness to become the purchaser provided it were shown that by the means described communication could be carried on between himself and the owner of the secret when stationed in opposite corners of a room, which test was refused on the grounds that in so short a distance the action would be scarcely discernible. The man was then dismissed with the remark that if for the purpose of trying the experiment it was necessary to travel to Egypt or Muscovy, he could himself proceed there if he chose, while the speaker would remain in Venice and attend to the rest.

Cabeo in 1629 gave the first picture of a sympathetic tel-

egraph in his *Philosophia magnetica* (No. 97). It shows a dial with a small-letter alphabet around the outer edge, and a magnetic needle pivoted at the center. Robert Turner was the first English writer to represent this dial, which appears in his translation of *Ars notoria: the notory art of Solomon,* 1657 (No. 144). The illustration there given differs from that of Cabeo in having the alphabet printed in capital letters.

Joseph Glanvill in *The Vanity of dogmatizing,* 1661, (No. 147), describes in full detail the magnetic sympathetic telegraph.* He adds that while the telegraph "may not yet answer the expectation of inquisitive *experiment;* yet 'tis no despicable item, that by some such way of *magnetick efficiency,* it may hereafter with success be attempted, when *Magical* History shall be enlarged by riper inspections: and 'tis not unlikely, but that present discoveries might be improved to the performance." This passage has been relied upon by those who would assign to Glanvill an early anticipation of the modern telegraph. The author then proceeds to describe a still more curious method of sympathetic communication, known as the *flesh* telegraph. This form is alluded to by Paracelsus in his *De secretis naturæ mysteriis,* 1570, and is said to have found credence with Rosicrucians and other esoterics of the seventeenth century. The description by Glanvill is as follows:

"There is besides this another way, which is said to have advanced the *secret* beyond *speculation,* and compleated it in *practice.* That some have conferred at distance by *sympathized hands,* and in a moment have thus transmitted their thoughts to each other, there are late specious relations to attest it: which say, that the hands of two friends being *sympathized* by a transferring of *flesh* from one into the

* See Vol. I., p. 130 for a reproduction of a page of this description.

other, and the place of the *letters* mutually agreed on; the least prick in the hand of one, the other will be sensible of, and that in the same part of his own. And thus the distant friend by a new kind of *Chiromancy* may read in his own hand what his correspondent had set down in his. For instance, would I in *London* acquaint my intimate in *Paris,* that *I am well:* I would then prick that part where I had appointed the letter [*I:*] and doing so in another place to signifie that word was done, proceed to [*A,*] *thence to* [*M,*] and so on, till I had finisht what I intended to make known."

The sympathetic telegraph was alluded to by many writers down to the nineteenth century. Among the contributions to the subject, the best known, in addition to those cited above, are by Daniel Schwenter in his *Steganologia* (No. 73), by Famianus Strada in his *Prolusiones academicæ,* 1617 (No. 90), and by Addison in the *Spectator,* 1711 (No. 874).

Below is given a list of writings in which such references or descriptions occur, including a few titles not in the A. I. E. E. Library. The number prefixed to each entry denotes the year of publication of the first edition; in brackets are given the catalogue number and the page on which a reference occurs. A list is also given of notable references to the writings in general of Porta, Schwenter and Strada.

1558. Porta, J. B. Magiæ naturalis . . . . libri IIII. (No. 47, pp. 88–90.) *Naples, 1558*

——Another edition. (No. 47a, pp. 73–75.) *Antwerp, 1560*

——Another edition. (No. 47b, pp. 73–75.) *Antwerp, 1561*

1589. Porta, J. B. Magiæ naturalis . . . . libri XX. (No. 64, p. 128.) *Naples, 1589*

Porta gives the first clear description of the sympathetic compasses.

——Another edition. (No. 64a, p. 289.) *Frankfort, 1607*

——Another edition. (No. 64b, p. 190.) *London, 1658*

1599. Panciroli, G. Rerum memorabilium sive deperditarum. (No. 98, p. 237.) *Frankfort, 1629–1631*

1600. Sunde, J. H. (*i.e.,* Daniel Schwenter) Steganologia et steganographia. (No. 73, p. 127.) *Nuremberg, 1600*

"He calls the attention of his correspondent by ringing bells by means of bar magnets. His needles are also moved by bar magnets, and the letters are formed by one, two, or three strokes to the right or left as in Cooke & Wheatstone's system. His ideas are purely cabalistic, but his curious anticipations of the modern telegraph are very singular."—*Latimer Clark.*

1609. Boodt, A. B. de. Le perfaict joaillier. (No. 120, p. 598.) *Lyons, 1644*

1609. Boodt, A. B. de. Gemmarum et lapidum historia. (No. 120a, p. 464.) *Leyden, 1647*

Latin translation of the above work by A. Toll.

1610. Arlensis, P. Sympathia septem metallorum. (No. 82, p. 275.) *Paris, 1610*

1617. Strada, F. Prolusiones Academicæ. (No. 90, p. 306.) *Lyons, 1617*

The well known poem on the lover's telegraph.

1624. Van Etten. (*i. e.,* Jean Leurechon.) Récréation mathématique. (No. 93, p. 94.) *Paris, 1626*

——Another edition. (Critical edition by Claude Mydorge.) (No. 101, pp. 140–144.) *Paris, 1630*

——Another (5th) edition. (No. 93a, p. 161.) *Paris 1659*

——Another edition. (English translation.) (No. 93b, p. 104.) *London, 1633*

——Another edition. (English translation.) (No. 93c, p. 106.) *London, 1674*

1629. Cabeo, N. Philosophia magnetica. (No. 97, p. 302.) *Cologne, 1629*

Contains the first drawing of the sympathetic telegraph.

1630. **Hakewill,** G. An apologie or declaration. (No. 99, p. 286.) *Oxford, 1630*

1630. **Mydorge,** Cl. Examen du livre des récréations mathématiques. (No. 101, problem 74, pp. 140–144.) *Paris, 1630*

1631. **Kircher,** A. Ars magnesia. (No. 102, pp. 35–36.) *Wurtzburg, 1631*

1632. **Galileo,** G. Systema cosmicum. (No. 108, p. 88.) *Strasburg, 1635*

1636. **Schwenter,** D. Deliciae physico-mathematicæ. 3 vols. (No. 110bis, Vol. I, p. 347.) *Nuremberg, 1636–1692*

1637. **Servius,** P. De natura artisque miraculis. See pages 336, 456 of theatricum sympatheticum auctum. (No. 152.) *Nuremberg, 1662*

1638. **Fludd,** R. Philosophia moysaica. (No. 112, Sec. II, lib. ii, memb. ii, cap 5; and Sec. II, lib. ii, passim.) *Gouda, 1638*

1641. **Kircher,** A. Magnes sive de arte magnetica. (No. 116, p. 382.) *Rome, 1641*

——Another edition. (No. 116a, pp. 281, 536 and ff.)

1641. **Wilkins,** J. Mercury. (No. 117, p. 146.) *London, 1641*

——Second edition. (No. 117a, p. 147.) *London, 1694*

1646. **Browne,** Th. Pseudodoxia epidemica. (No. 123, p. 76.) *London, 1646*

1657. **Turner,** R. Ars notoria. (No. 144, p. 136.) *London, 1657*

The first English writer who gives a figure of the magnetic dial.

1657–1659. **Schott,** G. Magia universalis naturae et artis. 4 vols. (No. 184, Vol. IV, p. 49.) *Bamberg, 1677*

Copied from de Sunde and Kircher.

1661. **Glanvill,** J. The vanity of dogmatizing. (No. 147, p. 203.) *London, 1661*

1662–1663. **Westen,** W. van. Mathematische vermaecklyckheden. (No. 151, p. 128.) *Arnheim, 1662–1663*

1665. **Glanvill,** J. Scepsis scientifica. (No. 147a, p. 149.) *London, 1665*

1665. **Schott,** G. Schola steganographica. (No. 190, pp. 258–260.) *Nuremberg, 1680*

His description is copied from de Sunde.

1676. **Heidel,** W. E. Trithemii steganographia. (No. 180, p. 358.) *Mayence, 1676*

1682. **Hiller,** L. H. Mysterium artis steganographicae. (No. 193.) *Ulm, 1682*

See Preface. This book is referred to in de Sunde, 1640.

1684. **de Lanis, Fr.** Magisterium naturae et artis. 3 vols. (No. 197, Vol III., p. 412.) *Brescia, 1684–1696*

1684.(?) **Marana,** J. P. Letters writ by a Turkish spy. 9 vols. (No. 282, Vol. I., p. 116.) *London, 1734*

1696. **Vallemont,** P. de. La physique occulte. (No. 206a.) *Paris, 1696*

The Paris edition 1696 has an appendix (not in the 1693 edition), which on page 32 gives an account of the sympathetic telegraph.

1701–1702. **Le Brun,** P. Histoire critique des pratiques superstitieuses. 2 vols. (No. 225, Vol. I., p. 293.) *Rouen, 1701–1702*

1711. **The Spectator.** Reprint. (No. 874, p. 345.) *London, 1832*

The well-known and interesting account of the sympathetic telegraph appears in the number dated December 6, 1711.

1718. **Albertus Parvus.** Les secrets merveilleux. (No. 407, p. 228.) *Lyons, 1762*

1723. **Santanelli,** F. Philosophiae reconditae. (No. 261, Chap. IV.) *Cologne, 1723*

1731. **Reibelt,** J. J. A. De physicis et pragmaticis magnetis mysteriis. (No. 278, Part I., p. 98.) *Wurtzburg, 1731*

1736. **Bailey,** N. Dictionarium Britannicum. (No. 286.) *London, 1736*

See the word *lodestone.*

1744. **Akenside,** M. The pleasures of the imagination. (No. 597.) *London, 1796*

Book III, verses 325-347, contains a free translation of Strada's poem on the sympathetic compasses. In a footnote the author says, "See the elegant poem recited by Cardinal Bembo in the character of Lucretius."

1762. **Diderot,** D. Mémoires. 2 vols. (No. 997, Vol. I., p. 278.) *Paris, 1841*

Diderot in a letter to Madame Volland dated July 28, 1762, alludes to Comus (Ledru) and his supposed telegraph.

1764. **L'espion Chinois.** 2 vols. 12mo. (No. 413, Vol. I., p. 116.) *Cologne, 1764*

1769–1770. **Guyot,** E. G. Nouvelles récréations physiques et mathématiques. 4 vols. (No. 426.) *Paris, 1769–1770*

Contains a chapter on "the sympathetic magnetic-telegraph treated as myth and absurdity." Vol. 1, page 134, has a full description with illustrations.

1772. **Deffand,** Madame du. Correspondence. 2 vols. (No. 1449, Vol. II., p. 99.) *Paris, 1859*

1797. **Edgeworth,** R. L. A letter to the Earl of Charlemont on the tellograph and on the defence of Ireland. (No. 605, p. 5.) *Dublin, 1797*

1797. **Gamble,** J. Observations on telegraphic experiments; or, the different modes which have been or may be adopted for the purpose of distant communication. (No. 607.) *London, 1797 (?)*

1869. **Sabine**, R. History and progress of the electric telegraph. (No. 1698a.) *London, 1869*
The preface contains a chapter on "Galileo and sympathetic compasses," which is omitted in the first edition of 1867.

1871. **Gherardi**, S. Sopra un' idea di telegrafo magnetico. (No. 1799.) *Florence, 1871*
Refers to the descriptions of the sympathetic telegraph by Porta, 1589; Strada, 1617, and van Etten, 1626.

1881. **Wheatley**, H. B. The sympathetic telegraph. (No. 4156.) *London, 1881*
Contains references to Strada, Schwenter, Hakewill and others.

1881. List of a selection of works relating to electricity and magnetism exhibited by Latimer Clark at the Exposition Internationale d'Électricité, Paris, 1881. 10 pp. (No. 4120.) *(London, 1881)*
Pages 7-10 deal especially with the bibliography of the sympathetic telegraph.

1884. **Fahie**, J. J. A history of electric telegraphy to the year 1837. (No. 2354.) *London, 1884*
Pages 20-25 contain a list of works on sympathetic telegraph in the Clark collection and in the British Museum catalogue.

NOT IN A. I. E. E. LIBRARY.

1586. **Vigenere**, Blaise de. Traicté des chiffres, ou Secretes manieres d'éscrire. *Paris, 1586*
Quoted in *L'Électricien* of Jan. 15, 1884, page 95.

1610. **Argolus**, Andreas. Epistola ad Davidum Fabricum Frisium. *In Ephemeridae Patavii, 1610*
With a "Steganographic Compass," he "held many agreeable conversations with one of his friends."

1663. **Helvetius**, J. F. Theatridium Herculis Triumphantis. (pp. 11 and 15.) *The Hague, 1663*

1679. **Maxwell**, William. De medicinâ magnetica. (Chaps. 11, 12, and 13.) *Frankfort, 1679*

1689. **Blagrave**, Joseph. Astrological practice of physick. (p. 112.) *Paris, 1689*

1689. **De Rennefort** (Souchu). L'aiman mystique. *Paris, 1689*

1750–1751. **"Misographos."** The student; or the Oxford and Cambridge Monthly Miscellany. 2 vols. (Vol. I., p. 354.)
A translation of Strada's verses.
Oxford, 1750–1751

1788. **Barthelemy**, J. J. Voyage du jeune Anarcharsis en Grèce. *Paris, 1788*
Quoted in Journal of the Society of Arts, May 20, 1859, page 472.

1795. **Edgeworth**, R. L. Essay on the art of conveying secret and swift intelligence. Published in the Trans. of the R. Irish Academy. (Vol. VI., p. 125.) *Dublin, 1797*

1798. **Gamble**, J. Essay on the different modes of communication of signals. (p. 57.) *London, 1797*

REFERENCES TO GIOVANNI BATTISTA PORTA.

Arlensis, P. Sympathia septem metallorum. (No. 82.) *Paris, 1610*
The author tried to operate a pair of sympathetic compasses according to Porta's indications, but failed, p. 275.

Kircher, A. Ars magnesia. (No. 102.) *Wurtzburg, 1631*
Remarks on Porta's telegraph, p. 35.

Sorbière, S. de. Sorbieriana. (No. 211.) *Paris, 1694*
Criticism on Porta, p. 169.

Mercier, de St. Leger, B. Notice raisonné des ouvrages de Schott. (No. 531.) *Paris, 1785*
Reference, p. 28 to Porta's *Magiæ*, 1558.

Duchesne, H. G. Notice historique sur la vie et les ouvrages de J. B. Porta. (No. 628.) *Paris, 1801*
An analysis is given of each important work of Porta.

Boncompagni, L. B. Intorno ad alcuni avanzamenti dell fisica in Italia nei secoli xvi e xvii. (No. 1094.) *Rome, 1846*
Analysis of the scientific work of Porta.

Gherardi, S. Sopra un' idea di telegrafo magnetico. (No. 1799.) *Florence, 1871*
Refers to the notice of the magnetic telegraph in Porta's *Magiæ*, 1589.

REFERENCES TO SCHWENTER (DE SUNDE).

Schott, G. Schola steganographica. (No. 190.) *Nuremberg, 1680*
Reference to Schwenter, 259, under his assumed name de Sunde.

Hiller, L. H. Mysterium artis steganographicae. (No. 193.) *Ulm, 1682*
Schwenter is quoted on p. 278 under his assumed name.

Wheatley, H. H. The sympathetic telegraph. (No. 4156.) *London, 1881*

BOOKS CONTAINING STRADA'S POEM ON SYMPATHETIC TELEGRAPHY WITH ADDITIONAL REFERENCES TO STRADA.

Claudianus, Cl. Opera. (No. 55.) *Antwerp, 1571*
A poem by Claudianus on the lodestone (p. 322) is said to have suggested to Famianus Strada his famous poem on the magnet, published in *Prolusiones Academicæ*, 1617, No. 90.

Hakewill, G. An apologie or declaration. (No. 99.) *Oxford, 1630*
Contains the Latin text and a metrical translation of Strada's poem, p. 286.

Kircher, A. Ars magnesia. (No. 102.) *Wurtzburg, 1631*
Strada's poem, p. 36.

Ward, S. Magnetis reductorium. (No. 111.) *London, 1637*
Strada's poem, p. 150. (Translated in his *Wonders of the loadstone*, 1640.)

Harrison, E. Idea longitudinis. (No. 213.) *London, 1696*
Strada's poem, p. 46.

The Spectator. (No. 874.) *London, 1832*
Strada's sympathetic needles and allusion to a magnetic telegraph, p. 345.

The Guardian. 2 vols. (No. 344.) *London, 1747*
Strada's poem, Vol. II, p. 213.

Gherardi, S. Sopra un' idea di telegrafo magnetico. (No. 1799.) *Florence, 1871*
Reference to Strada's *Prolusiones.*

Solly, E. On the applications of electricity to practical purposes. (No. 2875.) *London, 1847*
Remarks on Strada's *Prolusiones,* 1617.

Axon, W. E. A. Note on a passage in Strada containing a prevision of the electric telegraph. (No. 3857.) *Manchester, 1877*

Grimshaw, H. Note on a curious allusion of a writer of the XVII century. (No. 3875.) *Manchester, 1877*

Jevons, W. S. Note on the early anticipations of a magnetic telegraph. (No. 3878.) *Manchester, 1877*
Reference is to Strada's sympathetic telegraph.

Wheatley, H. B. The sympathetic telegraph. (No. 4156.) *London, 1881*

References to Van Etten (*i.e.,* Jean Leurechon).

Bertelli, T. Di un supposto sistema telegrafico magnetico indicato da alcuni autori del secolo xvi e xvii. (No. 1711.) *Rome, 1868*
Discusses at length the reference to the magnetic telegraph in van Etten's *Récréations Mathématiques,* and also to notes in van Westen's translation of this work.

Gherardi, S. Sopra un idea di telegrafo magnetico. (No. 1799.) *Florence, 1871*
Reference to van Etten's *Récréations mathématiques.*

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Library of the American Institute of Electrical Engineers

REPORT OF LIBRARY COMMITTEE, 1903

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

REPORT OF LIBRARY COMMITTEE

We beg to submit herewith a report on the present condition of the Library of the Institute, including a statement of receipts and expenditures from the inception of the Library to May 1, 1903; statistics as to the number of volumes and titles; valuation of books and fixtures; statement of sources from which the books have been derived, etc. Owing to the extraordinarily rapid manner in which the Library has sprung up, an immense amount of detail has been involved in establishing it on a firm basis with respect to records, collation of periodicals, cataloguing and other work necessary to place the collection in permanent order and efficient working condition, as well as to determine the additions immediately desirable of modern books and those necessary to fill out incomplete sets of periodicals and Transactions of learned societies. This work is now so far advanced as to admit of the compilation of the statistics submitted herewith. As this is the first report which the Library Committee has rendered, it may not be amiss to place on record here a brief account of the inception and growth of the Library.

At a meeting of the Council in January, 1900, $500 was appropriated for the purchase of two book stacks and to defray the cost of binding the more important of the periodicals received in exchange for the Institute *Transactions,* and which for years had been accumulating. At the same time a Library Committee was named to carry out this work. Previous to the appointment of the Committee the Institute had a miscellaneous collection of several hundred books, largely the gift of the late Mr. George B. Prescott, Jr., and of publishers, together with several bound sets of electrical periodicals. In January, 1901, the Committee asked for another appropriation of $500, but receiving only $100, it was

decided that an endeavor should be made to enlist the interest of individual members in building up the Library. Though no general appeal was made, the response from the beginning was extremely encouraging, and the result to date is indicated in the statement that of 8,139 volumes now in the Library, all but 1,653 are the gift of individual members, this latter number including exchange periodicals and 395 volumes purchased from the Carnegie fund; aside from bound exchange periodicals, only 14 volumes have thus far been purchased from Institute funds. The list of donors to date includes 57 names.

The first gift received was a complete set of *Comptes Rendus* (140 volumes) from Mr. C. O. Mailloux, followed soon after by a set of the *Proceedings* of the Royal Society from Mr. Edward Caldwell, and a set of the *American Journal of Science* and *Journal* of Franklin Institute from Dr. Cary T. Hutchinson. During the first three months the gifts aggregated almost 500 volumes.

The latter part of February, 1901, it was learned that the celebrated Latimer Clark Collection of electrical books, pamphlets, autographs and portraits was for sale, and the matter of its purchase for the Institute was immediately brought to the attention of Mr. Andrew Carnegie. While the negotiations with Mr. Carnegie were proceeding, but yet in doubt, Dr. Wheeler purchased the collection, and signified his intention of presenting to the Institute the books and pamphlets contained therein. Subsequently, a favorable reply was received from Mr. Carnegie, and when a committee called to inform him of the circumstances under which the collection had just been bought, he expressed much admiration for the *esprit du corps* exhibited by Dr. Wheeler; and the suggestion having been made that a fund would be desirable with which to house, catalogue and complete the collection, he immediately said he would donate for that purpose a sum equal to the expenditure of Dr. Wheeler. When the total cost, $6,880.28, was finally determined and communicated to Mr. Carnegie, he gave his check for that amount. Of this sum $828.10 has been expended for book stacks and library fixtures, $3,500 was set aside for the bibliography of the collection, and the remainder was reserved for book purchases.

At the annual meeting, May 21, 1901, Dr. Wheeler presented to the Institute the books and pamphlets of the Latimer Clark

collection, subject to certain conditions set forth in a Deed of Gift, as follows: [The Deed of Gift follows the title-page of Vol. I. of this Catalogue.]

For the information of members, a check list was printed in the Institute *Transactions* of March, 1903, of the books and pamphlets in the Wheeler Gift published prior to 1826, including somewhat more than 900 titles. Dr. Wheeler has recently authorized the Library Committee to purchase at his cost such works as will make his gift as completely representative as possible of early electrical literature, and a list of such works is now being compiled.

The bibliography of the Wheeler Gift is now under preparation at the hands of Brother Potamian, Sc.D., Lond., Professor of Physics in Manhattan College, New York, a distinguished authority on early electrical literature. Each title will be accompanied by a note characterizing the contents of the volume, or indicating the feature that constitutes its value or celebrity. As the collection is particularly rich in the literature of early electrical science and in the pamphlet literature relating to the beginnings of the electrical arts, the work promises through its annotations to have a unique value aside from its character as a catalogue. In accordance with the terms of the Wheeler Deed of Gift, a copy will be given without charge to each member of the Institute.

Next to the Wheeler Gift in importance are the various donations by Mr. C. O. Mailloux, which are almost completely inclusive of the great Transactions of French scientific bodies. In addition to the *Comptes Rendus* above referred to, the list includes complete sets of *Annales de Chimie et Physique* (317 volumes); *Journal de Physique* (29 volumes); *Mémoires de l'Académie des Sciences* from 1666 to date (250 volumes), lacking only the volumes for the years 1778-1795, which Mr. Mailloux has authorized the Library Committee to obtain at his cost when they come on the market; *Mémoires presentés à l'Académie des Sciences par Divers Savants* (34 volumes); *Proceedings* of the Austrian Society of Engineers (56 volumes); a complete set of *Zeitschrift für Instrumentenkunde* (25 volumes); and a number of early works relating to learned societies. Mr. Mailloux has also defrayed the cost of binding or rebinding several hundred volumes of his gift.

In order to keep up the several sets of his gift, Mr. Mailloux has presented to the Library a fund of such an amount that its

annual proceeds will defray the cost of future subscriptions to the various publications and the cost of binding the yearly additions.

Mr. Edward D. Adams has donated a complete set in splendid condition of all the publications of the Royal Society. These include the *Transactions,* unabridged, from 1665 to date (223 volumes); *Proceedings* of the Royal Society (70 volumes); Royal Society *Catalogue of Scientific Papers* (12 volumes); and a complete set of the various *Histories* of the Society—six in number (10 volumes)—the total aggregating 315 volumes. Mr. Adams defrayed the cost of rebinding the above uniformly in half morocco with gilt tops, and is also having engraved at his cost by Mr. E. D. French a book plate for the Library.

The American Bell Telephone Company presented a valuable collection (92 volumes) relating to the telephone, including Records, Briefs, etc., of telephone suits, and rare early publications and papers relating to the telephone; also 15 volumes of electric railway patent specifications from the earliest issue to 1896.

Through the gift of five patent attorneys the Library has come into possession of a set of U. S. Electrical Patent Specifications from the earliest issue up to June 30, 1891.

Mr. Joseph Wetzler presented a complete set of Dingler's *Polytechnisches Journal,* 1820-1901 (319 volumes), and from Mr. Charles L. Clarke has been received a valuable collection of 40 volumes of Records, Briefs, etc., relating to incandescent lamp litigation.

Mr. Bion J. Arnold has donated 5,000 marks for the purchase of a complete set of *Annalen der Physik* from 1790 to date. This set includes all of the rare early volumes, all indexes and all supplementary volumes.

From Mr. Thomas A. Edison a complete set of the valuable Italian periodical, *Nuovo Cimento,* has been received.

Following is a list of donors to May 1, 1903:

Adams, Edward D.
Amer. Bell Tel. Co.
American Electrician
Anderson, G. L.
Arnold, Bion J.
Auerbacher, L. J.
Bolton, H. C.
British Patent Office.
Brown, C. S. V.
Brown, J. Stanford.
Buckingham, C. L.
Caird, R.
Caldwell, Edward
Clarke, Chas. L.

Conservatoire des Arts et Metiers.
De Vinne, Theo. L.
Dunod, Vve.
Dunbar, J. W.
Dyer, R. N.
Electrical Review
Elec. World and Eng.
Fish, F. P.
Gauthier-Villars.
Griffin, Chas. & Co.
Howson & Howson.
Hutchinson, Dr. Cary T.
Jenks, W. J.
Johnston, W. J.
Keith, Dr. N. S.
Kinsman, F. E.
Lawrence, W. J.
Lockwood, T. D.
Lozier, R. T. E.
Macmillan Company.
Mailloux, C. O.
McGraw Pub. Co.
Martin, T. C.
Nat'l Acad. of Science.
Naud, C.
N. Y. Electrical Society.
Office Naval Intelligence.
Pope, Ralph W.
Reber, Col. Sam'l.
Rosenbaum, W. A.
Sheldon, Prof. Sam'l.
Société Française de Physique.
Stieringer, Luther.
U. S. Coast and Geodetic Survey.
Van Nostrand Co., D.
Varley, Richard.
Wakeman, J. M.
Waldo, Dr. Leonard.
Weaver, William D.
Wetzler, Joseph.
Wheeler, Dr. Schuyler S.
Wiley & Sons.
Wolcott, Townsend.

All gifts received are acknowledged in the *Transactions* of the Institute, the titles being accompanied, when thought advisable, by a note pointing out the scope of, or feature of interest in, a work. In case of gifts of Transactions, periodicals, etc., including a considerable number of volumes, the name of the donor is stamped on the back, thus giving to the collection an individuality and at the same time denoting the *esprit de corps* to which the Library owes its existence.

The policy of the Library Committee is to endeavor to make the collection so complete in all the original sources of electrical knowledge that it will be invaluable for purposes of historical and scientific research. To this end particular attention is at the present time being paid to obtaining sets of the Transactions of the more important of the older learned bodies of the world, which up to about the middle of last century were almost the sole repositories of electrical knowledge. Owing to the demands of the libraries connected with technical courses, particularly those of the many technical schools now being organized in Europe, the rarity of these publications is rapidly becoming greater, and the

indications are that in a few years the more important will be unobtainable.

So far as funds available will permit, there will be placed in the Library complete sets of the more important electrical periodicals which have been published during the past half century. About sixty of the leading current electrical and cognate periodicals are now bound annually. The greatest effort will be made to obtain for the Library copies of the records and briefs of all electrical American patent litigation, which are of extreme value with relation to the history of the art; and it is hoped eventually to place in the Library the electrical patent publications of the leading countries of the world. Finally, the plans include having the collection eventually contain every book and pamphlet that has been printed in this country relating to electricity.

To provide a complete working electrical library for engineers, lists as full as has been possible to compile have been made of all authoritative works in the English, French and German languages now in print and not in the Library relating to electrical engineering and science. Recently several hundred volumes in the French and German languages have been placed on the shelves, which include the more important modern works in these languages. Part of an extensive list of English and American books has already been purchased, and during the year what funds are set aside for this purpose will be expended in further purchases. As received, a list of the books purchased will be printed in the monthly *Transactions* of the Institute.

The Library is now housed in three rooms of the suite occupied by the Institute at 95 Liberty Street. The space is ill adapted for Library purposes, and the room available for additions will probably all be taken up by the end of the current fiscal year. At present the books are being arranged on the shelves so far as possible in classes corresponding to the main divisions of electrical science and engineering. An author catalogue of the collection has been completed, but the matter of a subject catalogue has not yet been taken up. In view of the rapid rate at which the collection is growing, and the fact that those referring to the books with few exceptions do not need the same guidance as the patrons of the usual public library, the compilation of a subject catalogue can, it is thought, be well deferred to a later date.

The greatest present need is an index to the various sets of scientific Transactions and to the more important articles in the sets of the leading electrical periodicals. The Library Committee hopes at some time in the future to enlist the interest of some friend of the Institute in the matter of supplying this need by the donation of an endowment fund for the compilation and publication of keys to these classes. Some years would be required to compile and publish keys to the Transactions and periodicals, after which the proceeds of the endowment might be devoted to printing monthly an index to the periodical electrical and physical literature of the world, including papers read before the learned bodies of the world. While the plan of such publication has not yet been worked out in all of its details, the main idea is an index in which the entries would be as brief as consistent with their object in pointing out to a reader if the paper or article is one which would interest him—thus not having the character of abstracts; and arrangements would be made with some book-selling firm or firms for the sale of coupon books, and the issue of a list of all journals covered by the index, together with the prices at which copies would be supplied upon application.

Another extremely desirable addition to the Library is a complete set of U. S. Electrical Patent Specifications, and provision for keeping up the same, including binding. The beginning of such a collection has already been provided for through the generosity of the patent attorneys above referred to, and it is hoped to obtain from some friend of the Institute a sum sufficient to complete the collection and provide an endowment fund for its continuation in the future.

Following are given statistics of the Library under the heads of source, titles, volumes and valuation. The duplicates, which are all separately catalogued and carefully stored, furnish a nucleus for a branch of the Library which some time in the future may be considered. With this in view it is hoped in time to fill out the incomplete sets of periodicals comprised.

In making up the valuation of the collection as given in the accompanying table, the following system was pursued:

The Wheeler Collection is valued at its cost, and similarly where books were specially purchased for donation to the Library, the price paid by the donors for the same is entered. In the case of other

STATISTICS OF LIBRARY

SOURCE	Titles	Volumes	Valuation
OLD LIBRARY:			
Books	213	231	$265.00
Periodicals	6	90	180.00
PURCHASES:			
Carnegie Fund	7	395	862.85
Institute Appropriations	14	14	33.22
Periodicals. Bound	72	923	1,846.00
S. S. WHEELER:			
Latimer Clark Collection — Books	1943	2048	6,880.28
Latimer Clark Collection — Pamphlets	3450	195	
Latimer Clark Collection — Periodicals	91	1378	
Recent Additions	62	74	120.25
GIFTS:			
Edward D. Adams	9	315	2,019.06
American Bell Telephone Co	39	107	500.00
Chas. L. Clarke	8	40	100.00
Cary T. Hutchinson	88	371	643.94
Nathaniel S. Keith	43	55	100.00
C. O. Mailloux	12	850	1,803.23
McGraw Publishing Co	59	192	241.45
New York Electrical Society	51	54	52.50
W. D. Weaver	75	127	178.75
Joseph Wetzler	1	319	245.00
F. P. Fish, W. A. Rosenbaum, Howson & Howson, R. N. Dyer, C. L. Buckingham — U. S. Electrical Patent Specifications	1	97	500.00
Miscellaneous Gifts, (42 donors)	133	264	299.25
	6377	8139	$16,870.78
Duplicates	178	412	659.68
Total	6199	7727	$16,211.10

books, the valuation is based on the wholesale price of books now in print, and on what it was thought the books out of print could be procured for if for sale at second hand. The newly bound volumes of periodicals were uniformly entered at $2.00 per volume, and those in older binding at this or a less price, depending upon the state of the binding. The donations consisting largely of patent records and specifications, such as those of the American Bell Telephone Company, and Mr. Charles L. Clarke and Dr. Nathaniel S. Keith, have been given arbitrary values, which in each case is thought to be well within a price which a public library would be willing to pay for any of the several collections.

* * * * * * * * *

Respectfully submitted,

WM. D. WEAVER, *Chairman.*
W. J. JENKS,
CHAS. E. KNOX,
LEONARD WALDO,

NOTE—Mr. Gano S. Dunn, member of the Library Committee, was abroad when this report was prepared and presented to the Board of Directors.

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